The TROPICAL AGRICULTURIST

MONTHLY.

XXII. COLOMBO, FEBRUARY 2ND, 1902. No. 8.

REPORT ON HEVEA BRASILIENSIS IN THE MALAY PENINSULA.

By Stanley Arden,

Superintendent, Experimental Plantations, Federated Malay States, 1902.

HEVEA BRASILIENSIS.

SHORT HISTORY.

H*EVEA BRASILIENSIS*, the tree furnishing the Para rubber of commerce, is a native of Tropical America and was introduced into the British possessions in the East, at considerable cost and trouble, by the Indian Government in 1876 through the instrumentality of Kew. According to the Kew Report for that year a Mr. Wickham was commissoned to colleot seeds at the rate of £10 per 1,000. "He succeeded in obtaining 70,000 in the Siringals of the Rio Sapajos which he packed with the greatest care and with a full knowledge of their evanescent vitality; and coming straight home with them arrived at Kew on 14th June, 1876. Although sown on the following day, of these only $3\frac{3}{4}$ per cent germinated." At Sir Joseph Hooker's suggestion, it was arranged that the seedlings should be sent to Ceylon, to be cultivated and propagated for subsequent distribution to the hot and moist districts of the Indian Empire, and the late Dr. Trimen (then Director of the Peradeniya Gardens reports, that thirtyeight Wardian cases, containing 1,919 plants, despatched from Kew on August 12th, were received at Peradeniya in very good order.

In the same year (1876) plants of Para rubber were forwarded direct from Kew to Singapore, and the following year, Mr. Murton reported that "our climate is evidently suited for the growth of Hevea, judging by the progress the plants sent last year have made." It was introduced into Perak about the same time by Sir Hugh Low, but whether he obtained his plants from Singapore or Ceylon I have been unable to find out. That they were some of the original lot there is little doubt, for in 1879 he reports that "the Heveas are now 12 to 14 feet high. They take to the country immensely," and in 1883 he reports "the trees are now six years old."

In the year 1887 some seeds were obtained from these trees and planted in the Museum Grounds at Taiping; others were sown at Kummuning Estate (Perak) and a few years later at S'tiawau (Perak).

There seems to have been very little interest taken in the product, however, by planters, presumably on account of the high prices ruling for coffee about this time, and with the exception of the trees cited above, there are very few trees in the Native States over four years old. But with a decline in the price of coffee, planters began to look for other cultivations and during the season 1896—1897 the planting of rubber was taken up seriously. Since then its cultivation has received great attention and there are at the present time, in the Malay Peninsula alone, at least 12,000 acres planted with Hevea, representing about 1,500,000 trees, presumably the whole being the progeny of the trees originally introduced by the Government of India.

Of the many trees yielding commercial India-rubber the various species of Hevea are the most important, furnishing about one-third of the world's supply or 45,000,000 pounds of rubber annually, and always obtaining a market value in excess of that of all other commercial rubbers. To a certain extent this is no doubt due to the fact that Para rubber reaches the market in a purer and drier condition than most rubbers; the method of coagulation in vogue in Brazil not lending itself to adulteration to the same extent as is practised by collectors in other parts of the tropics.

CULTIVATION.

Conditions of Growth.—Although a native of the tropics of the New World, *Hevea brasiliensis* is admirably suited to the conditions obtaining in the Malay Peninsula and adjoining islands and its cultivation

here is a comparatively easy matter. From reports to hand it would appear that this tree naturally affects swampy places; but here it thrives in any locality—at low elevations, and on almost any kind of soil. Swampy districts or places that are periodically inundated are not essential to success and fine specimens are to be seen growing in what would generally be supposed to the most undesirable spots. A good tree for instance is growing in the Penang Botanic Gardens on a dry stony bank "*not at all the place I should choose," and although probably much smaller than if grown under better conditions, this tree has given an average annual yield of over 2½ pounds of rubber from the eleventh to the fifteenth year of its existence.

Other good specimens, 11 years old, 70-75 feet high with a mean girth of about 4½ feet at 3 feet from the base, are to be found in Perak, growing on disused mining land which is about as devoid of plant food as it is possible to find. If the reports concerning the conditions under which this tree grows in a wild state are correct, it is somewhat strange that it should flourish here under such different root conditions, for the only trees I have seen in the Peninsula which could hardly be said to be thriving were those which were planted in a swamp. I find the same fact is reported from Zanzibar, where the Director of Agriculture states that "although planted in typical rice swamps they are nearly all dead.' This at any rate goes to strengthen the theory that plants do not *always* occur naturally, under those conditions to which they are best adapted, although as a general rule it is as well in the cultivation of plants to imitate as far as possible the conditions which the plant is known to affect.

There are many instances of plants succeeding much better in the country of their adoption, and the orange may be cited as an example: this plant although indigenous to eastern Asia succeeds nowhere so well as it does in Southern Europe and California. Some writers have advocated the cultivation of Heveas on partly cleared land or in lines cut through the jungle; and others to plant it very closely on the assumption that being a jungle plant it would require plenty of shade. But this I venture to think is a mistake, for we are informed that in the forests of Brazil it towers above all other vegetation, thus indicating, that so far from being a shade loving plant it enjoys plenty of light.

Nothing could succeed better than this tree does in the Federated Malay States, planted on newly cleared, well drained land; and although it is often stated that partial shade, swampy places and other conditions are essential to success, given a climate with a uniform temperature of about 90° F., and a large rainfall equally distributed throughout the year, the conditions laid down above are eminently suitable. So far as I can judge it does not appear that the nature of the soil affects either the quantity or the quality of the latex (milk) but in any case it is advisable to plant on a fairly rich soil, a loamy soil for preference, as under such circumstances the tree would grow quicker and stronger, and probably give a return at a younger age than if grown on land deficient in the necessary constituents of plant life. The rate of growth is very rapid, and I have measured trees grown under the conditions recommended, which were 2 feet 6 inches in girth at a yard from the base, and approximately 30 feet high though only 4 years old; although this must not be taken as an average size. The mean girth of an acre containing 161 trees, 3½ years old, was 17·51 inches, and that of an acre of 4 year old trees 22·45 inches, while 10 year old trees, growing on a very sandy soil at S'tiawan, Perak, were approximately 65 to 75 feet high, having an average circumference of about 4 feet 6 inches taken at 3 feet from the ground, the largest being 5 feet 5 inches.

* C. Curtis, F.L.S., Annual Report, 1900.

Germination of the seed.—The usual method adopted when planting Hevea is to germinate the seeds in nurseries, where they remain until they are about 5 to 6 feet high, when they are cut down to within 6 inches or a foot of the ground; the stumps being then planted in the open, in holes previously cut and filled with surface soil, without any shade, and needing very little care beyond keeping the ground free from weeds for the first 3 or 4 years. This method, although retarding the growth for a short time, is perhaps advisable, especially on land which has previously been used for other cultivations, as a precaution against the attacks of vermin, which would greedily devour the seeds were they planted "at stake"; though on land from which the jungle has recently been burned off, the advantages do not appear to be quite so great.

Another very successful method is to germinate the seeds in small baskets—similar to the small strawberry baskets so familiar on the home markets and which could be made by coolies on the estate at a very cheap rate, or in bamboo pots—the hollow bamboo cut into lengths of about a foot. These should be nearly filled with soil and one seed placed in the centre of each, about 1½ inches deep, and the baskets or bamboo stood out in blocks, as near as possible to the place in which it is intended to plant them. When the ground is ready they can be put out into holes, without being removed from the basket, which will soon rot and the plants will thus avoid any check whatever. If bamboo pots are used, they should be split down each side, and the pieces can then be drawn out after the plant has been placed in the hole and surrounded with soil. This method is recommended when planting must be done in dry seasons, and although a little more expensive at first, will, I consider, repay the extra attention bestowed on the seedlings by avoiding the check which must necessarily ensue, when the system of planting from stumps is followed.

The watering of the seed in the nursery beds is a matter requiring careful attention. Before sowing, the soil should be thoroughly moistened, and if the surface becomes hard it must be stirred up again before watering, otherwise the water will not soak into it. The aim of the cultivator, however, should be to avoid the necessity of watering, by shading the beds fairly heavily, but if it becomes necessary it should be done *thoroughly* not *frequently*. The effect of 'sprinkling the seeds' when the soil has become dry, is disastrous, as it simply attracts the young growing tips of the roots towards the surface, there to be shrivelled up immediately the surface becomes dry again.

The chief difficulty in planting the seed "at stake," *i.e.*, in the position it is to permanently occupy, is that as it retains its vitality for so short a period, planting can only take place at definite intervals, for it is essential that the seed be sown within a week from the time it arrives at maturity. Nevertheless, I am of opinion that when possible this practice has points which recommend it to the consideration of those concerned. I refer more especially to the method invariably adopted by planters, of cutting away the tap-root when transplanting stumps from the nurseries. Now it should be remembered that in addition to it being an organ for the absorption of food, one of the functions of the root is to act as an organ of support, so that to cut away the tap-root is to deprive the plant of its main support.

Moreover, I consider it very probable that white ants effect an entry into the heart of the tree by means of the root so injured. I have examined scores of trees that have fallen over, due to the ravages of these insects, and the fact that at the time of falling, these trees were, almost without exception, to all appearances in a robust state of health, shews that the cambium layer was not affected, or at least only to a very small extent, while on examination the trunk of the tree was found to be completely riddled. I very much doubt whether these ants could enter into the heart of the tree protected as it is by the laticiferous

tissue (unless in very young trees where the tissue is only slightly developed) except by means of a wound previously made.

Some trees tapped somewhat severely about a year ago, and whose wounds are not yet healed over have been noticed. At the time of tapping, they were quite free from ants, but now are very badly attacked. In this case the wounds are 6 feet from the ground, and the ants after constructing earthworks up to the wounds, have entered the tree at a point where they have not encountered any laticiferous tissue. On other trees they will construct earthworks up to a height of 30 or 40 feet, sometimes more, in order to enter the tree at a point where the snapping off of a branch or a crack caused by the wind affords them a place of least resistance.

There is also the fungus to be taken into consideration; recently determined by Mr. Massee of Kew, as a species of *Helicobasidium*, 'a root parasite, nearly allied to *H. nompa* . . . very destructive to the mulberry tree in Japan': and it is probable that the injured root proves an acceptable host to this fungus, which exists on the living tissue. There has been some discussion as to whether the loss of trees is attributable to this fungus or to the ravages of the white ants, or to both, but in the large majority of trees I have examined neither one nor the other could be said to have *killed* the tree. Had the trees been *killed* by the fungus there would doubtless have been some indication of its presence some time previous to the tree falling over; but, as already stated, at the time of falling the tree generally appeared to be in a robust condition, and I incline to the belief that the fungus had prepared the way for the ants, which by eating away the heart of the trunk had caused the tree to fall simply for want of support.

Distancing.—A great difference of opinion exists on this subject, and at the present time this tree is being planted at distances varying from 10' x 10' (435 to the acre) to 36' x 36' or 33 trees per acre. Close planting is sometimes recommended as a means of obtaining a long straight trunk—a large tapping surface' but if it results in a diminished girth, I venture to think it a mistake, for, as will be seen later, the lower part of the trunk yields the largest proportion of latex. In order to procure a good stout trunk, over-crowding must be avoided, and the tree allowed plenty of light and air, so that it may produce a maximum amount of foliage, for a well developed crown invariably results in a good strong trunk. Again, if the latex acts as a reserve material, as it sometimes supposed, upon which the tree can rely in 'hard times'' we might imagine that the laticiferous tissue, *i.e.*, the latex producing tissue, would be most fully developed in those trees with the largest crowns for the following reason. In dry weather, evaporation by means of the foliage take place at an enormous rate, and the greater the amount of foliage the greater the evaporation which occurs and consequently the greater the necessity of a large food reserve, and it is reasonable to presume that the laticiferous tissue will be developed in accordance with the requirements of the individual tree. I have noticed repeatedly that trees growing on the edge of a plantation, or in more or less isolated spots and consequently able to obtain a maximum amount of light and air have given by far the best returns.

There does not appear to be any necessity to plant closely, even to ensure a tall tree, for Hevea seldom branches during the first two or three years of its existence, during which time it runs up forming a whip-like stem 20 to 30 feet high. To give some idea of the space required to allow this tree to develop itself, I may say that I have measured trees planted 36' x 36' which were touching each other at the tops and producing a dense canopy, nine years from the time of planting. Assuming that the roots cover the same area as the crown of the tree, which may be taken as a fact, it will be easy to imagine what a struggle for existence must ensue when trees are planted to 10' x 10'. It may however, be found, that although the individual tree yields a smaller quantity of latex when close planting is followed, that the loss will be compensated for by having a large number of trees to the acre. This, however, remains to be proved. There is the undoubted advantage that the cost of weeding will be reduced by planting closely, while on the other hand it will necessitate a deal of extra labour when tapping operations commence. However, taking all things into consideration, I am of opinion that in a country where land and labour is cheap, close planting is false economy.

INSECT PESTS AND FUNGOID DISEASES.

Of insect pests by far the most troublesome and destructive is the 'white ant,' *Termes gestroi*, previously referred to. With a view to exterminating this pest almost everything conceivable likely to prove beneficial has been tried, including lime, tar, arsenic, sulphate of copper, Jeye's fluid, etc., but up to the present nothing has been found which keeps the trees free for any length of time. Gondal fluid has recently been reported from India as an effectual remedy, but so far as I am aware has not yet been tried in this country: it is intended to experiment in this direction.

The only means of protecting the trees at present seems to be by constantly harassing the ants by destroying their earthworks which they built on the trunk, but although by this means the trunk of the tree is protected, the ants are still at liberty to attack the roots, which they often do, and thereby cause the death of the tree.

A species of weevil, nearly allied to, if not identical with *Astychus laterails*, has recently been discovered eating the foliage of Hevea, the life history of which is given by Mr. Wray.* In the beetle stage it feeds on the young foliage and when abundant is very destructive. The only remedy is systematic hand-picking, which may be readily accomplished, as on the least agitation of the branch on which the insect is feeding, the insect falls to the ground and shams death, and may be collected and destroyed. So far this insect has only been noticed on one estate and as it breeds but slowly, should be easily kept in hand if a smart look-out is kept from the time of its first appearance.

Fungoid diseases are, so far as I know, restricted to the species previously mentioned. Whenever this fungus is observed precautions should at once be taken to prevent it from spreading, for it will probably be useless to try and save the tree when once infected. An effectual preventative is to dig a trench all round the tree at a distance of 8 to 10 feet from the trunk and about 2 feet deep, taking care to throw all the soil removed from the trench towards the centre of the circle thus to throw all the soil removed from the trench towards the centre of the circle thus formed. A liberal dressing of lime or sulphate of copper should then be thrown into the trench and over the soil excavated; this will arrest the growth of the mycelium. The dead tree should not be allowed to lie on the ground, but chopped up and burnt.

When a tree has been tapped I would strongly advise that a coating of tar be applied to the exposed wood, to the exclusion of rain which might lodge in wounds and lead to decay, and as a protection against the growth of fungi, which are always difficult to eradicate when once established, and in some cases are exceedingly destructive.

EXTRACTION OF THE LATEX.

Under this heading the following points are dealt with, viz:—

1. Method of tapping:
   - (*a*). Instruments employed.
   - (*b*). The style of incision.
   - (*c*). Area of trunk to be worked.
   - (*d*). Length and distance between the incisions

* Perak Museum Notes, II., Part I. (1897.)

2. The effect of wounding the tree on the flow of the latex :

(a). The number of times the incisions can be advantageously renewed.

(b). The length of time that should elapse before renewing the incisions.

Preparatory to tapping, that part of the trunk it is intended to work should be well cleaned of all loose particles of bark and dirt. In old trees the rough outer bark may be shaved off with a blunt knife and then rubbed down with the husk of a coconut ; but in the case of young trees where the bark is not so thick and rough, a good rubbing over with a coconut husk will suffice. It cannot be too firmly borne in mind that foreign matter of every description decreases the value of the prepared rubber, and every endeavour should be made to avoid its inclusion from the commencement.

When tapping trees in isolated positions or on the edge of a plantation, the shady side of the tree should be selected, as the sun has the effect of coagulating the latex on the wound, thereby preventing a further flow and adding to the percentage of "scrap" or second grade rubber.

(a). *Instruments employed.*—The instruments used during these experiments were an ordinary five-eighth inch wood chisel and wooden mallet, and a sharp pruning knife. The chisel and mallet were ultimately discarded in favour of the knife, as it was found that with the latter the work could be done quicker and better ; while there was not quite the same danger of cutting into the wood, thereby causing permanent injury to the tree. Whatever form of knife is used, it should be kept very sharp so as to enable the operator to make as clean a cut as possible ; any tearing of the bark resulting from the use of a blunt instrument will tend to close up the cells and prevent a free egression of latex.

The collecting vessel used was a tin cup, about the size and shape of an ordinary cigarette tin, to which was affixed a metal lip. This lip being filed at the edge pierces the bark, rendering impossible any escape of latex between the tree and the collecting receptacle avoids the necessity of the use of luting material. The tin is also supported by this means so that nails, wire, etc., are unnecessary.

(b). *The kind of incision.*—The laticiferous or milk-producing tissue is composed of a number of vessels or tubes which by constant branching (anastomosing) have formed a complete network of tissue. In some trees, this system of communication between the cells is only developed to a very small degree ; while in others—notably in the *Dichopsis spp*, which furnish the gutta-percha of commerce, the cells containing the latex remain isolated. The more completely this system is developed the easier it becomes to extract the latex, as it is evident, that other things being equal, a less number of incisions will be required to extract a given quantity of latex.

The vessels constituting this tissue are chiefly distributed throughout the phlœm or inner layer of bark' so that whatever form the incision takes, it must be sufficiently deep to cut through this layer. Immediately beneath the laticiferous tissue lies a layer of active cells known as the cambium, and the operations should be conducted with care so as to incur as little injury to this layer as possible. I have found that it is practically impossible to cut through the milk-producing tissue without injuring, at least to some extent, the cambium ; but fortunately the tree is very hardy in this respect, so that if ordinary care is exercised, no serious consequence result.

The thickness of the bark varies from ¼ to 3-8 of an inch, gradually thickening as the base of the tree is approached.

In actual practice the object to be attained is to puncture the maximum number of the laticiferous tubes while doing as little injury to the tree as possible and as these tubes run more or less longitudinally, it is clear that a horizontal or an oblique incision will puncture more tubes than a vertical one. The difficulties arising in collecting the latex from a horizontal incision are obvious, so it remains to be seen what form the oblique incision should take ; whether it is advisable to make a single incision (/), or a double incision (V), or a number of double incisions feeding a central vertical channel and forming what is known as the "herring-bone" incision.

Experiments have been conducted at S'tiawan, Perak, with a view to ascertaining the difference in yield by these various methods, and the result of tapping five trees with single oblique incisions is shewn below. The incisions were made 6 inches apart, ranging from the ground to a height of 6 feet up the trunk, and in each case were 6 inches long, running at an angle of 30 degrees with the perpendicular.

Age of trees 9 years	Mean girth at 3 feet from base 4 feet 2 inches
120 incisions yielded ...	23·75 ounces of dry rubber
Average yield per incision	·19 " "

Twelve months later the same trees were tapped with double oblique incisions, the two lines forming the V being in each case 6 inches long. As in the former experiment, the incisions were equally distributed over the first 6 feet of the trunk, commencing at the base. The result was :—

Age of trees, 10 years.	Mean girth at 3 feet from base 4 feet 3 inches.
120 incisions yielded ..	44·25 ounces of dry rubber
Average yield per incision	·36 " "

Thus it will be seen that the V incisions gave considerably more, almost double, the amount obtained from the single incisions ; but as twice the amount of labour was required and twice the amount of injury inflicted upon the tree, the result may be said to be slightly in favour of the former method. The reason the yield is not quite in proportion to the labour expended, or rather to the surface exposed, is due to the fact that the two lines forming the V become so close to each other as they approach the base of the incision, that they probably puncture the same tubes.

We have now to compare the V incision with the herring-bone incision, which is practically the same principle, except that in this case there are a number of V incisions feeding a vertical channel, the latex being conducted by the oblique incisions towards the central channel at the base of which is placed the collecting tin. The feeders should be made to join the vertical incision at an angle sufficiently acute to enable the latex to escape freely—say 40 to 45 degrees, and care should be taken that these incisions do not join the central incision opposite to each other, or the result will be an ugly wound (Fig. *B*, *a*) which will take a considerable time to heal.

Fig. *A* shews the method to be followed and Fig. *B* the incorrect method.

Fig. *A*.

Fig. *B*.

The yield from 22 trees tapped on this principal, with two incisions per tree, one between the base and a height of 3 feet, the other on the opposite side of the tree at a height of 3 to 6 feet was as follows:—

Age of trees, 9 years.	Mean girth at 3 feet from base 4 feet 1 inch.
44 incisions made on 22 trees gave	·29 ounces of dry rubber
Average yield per incision	·65 ,, ,,

The central channel in each case was 2 feet 6 inches long and the 'feeders' 1 foot long. These were 1 foot apart, there being three on each side of the vertical channel.

Taking into consideration that the exposed surface, or the total length of the incision on these trees was 8 feet 6 inches, as against 1 foot in the case of those trees tapped with a V incision, and also that a much larger area was operated upon the yield is at first surprisingly small, being less than double the amount obtained from those trees tapped with V incisions while eight times the amount of labour was entailed in making the extra incisions. It is evident then that some other force is at work *viz*., the effect of wounding on the flow of latex, for, in this experiment the whole of the trunk was tapped on the same day, while in the two previous experiments there were five incisions per tree and the operations were carried on over a period of 24 days. This question will be considered later.

(*To be continued.*)

THE FIBRE INDUSTRIES.

The Textile Fibres of Commerce. By William S. Hannan Pp. x × 236. (London: Charles Griffin and Co., Ld., 1902.) Price 9s. net.

The title of this work raised a hope that the author had seized the opportunity open to any specialist of carrying on the critical labours of Vetillart, Wiesnet, Hugo Muller, J. Christie, Otto Witt, and the experts of the Colonial and Indian Exhibition, now almost of ancient history. The opportunity is a great one; for the subject matter is vast, the interests involved are stupendous while the first principles of the subject are few, very few, and so are they who recognise them. The opportunity is one, not merely for a book enunciating in one comprehensive view the relationships of our highly developed textile methods to one another and to the properties of the ultimate spinning units, but for a definite forecast of the progressive future, which is of obvious commercial moment.

The book before us, however, neither aims at nor claims to reach the pioneer standard of technical literature, and must be judged accordingly. The author's labours have no doubt been exhaustive and minute. But the failure to attain to the ideal standard is self-predicted by the opening sentence of the introduction:—

"The vegetable and mineral fibres of commerce may be arranged in four groups, viz. (1) plumose fibres (2) stem and leaf fibres; (3) fruit fibres (all derived from plants; and (4) mineral fibres. These groups are represented by the fibres used in various important industries, and by other vegetable fibres which at present are of special interest from a scientific point of view only."

This classification has no morphological basis and is devoid of technical significance. The sentence stands immediately beneath the title "The textile Fibres of Commerce," and the reference to these "other fibres," which are, in fact, from the point of view of commerce or industry, mere lumber, introduces us to the supposed antithesis of science to commerce, which is archaic, but in these days misleading, and were better left out. The introduction, in short, prepares us for the plan actually followed in the book, which is that of alphabetical sequence of the conventional or trivial names of the fibres; perhaps the best in the absence of a positive, critical basis and consequent classification. The reader is thus prepared to find the book a non-critical compilation, and although the title suggests the subordination of the matter to commercial that is industrial, proportions, the expert will be disappointed and the lay reader will get little instruction in the *practical science* of the subject.

Of course, be it understood, a book of 230 pages, upon such a subject, and containing 150 illustrations, mostly the original work of the author and friends, affords much interesting reading. This interest belongs to the subject, which is fascinating from whatever point of view it may be handled. We have no wish to depreciate the author's evident aim to popularise the subject; on the contrary, we wish for the book a successful run, and that a second edition may see a considerable improvement in the matter. But as we take the request in the preface for "any suggestions that will enable me to add to the utility of this work" as an honest invitation to the critic, we feel we should be wanting in honesty and in a duty to the technical public if we shirked the task of pointing out by a few examples the author's want of precision in handling fundamental questions. We cite first the introductory sentence of the section "Vegetable Fibres," p. 3, "Physical and Chemical Properties," which reads, "The principal vegetable fibres are plumose and bast. Both are used for spinning and weaving, and their prices fluctuate in accordance with the quality and quantity of the annual crops. The plumose fibres are composed of cellulose.

Plumose and bast should not be coupled with the same term "fibre" unless the author intends "ultimate fibre." We take it that the spinning unit is intended, and in the case of the bast fibres the unit is a more or less complex *filament*. Fibres are not used for spinning *and* weaving; the fibres or filaments are spun into yarns and the yarns woven. It is fairly obvious that prices vary with supply and quality, but there is something to be said for demand. Why, however, interject this superficial reference to the important question of value under the heading of "Physical and Chemical Properties"?

Lastly, to describe the plumose fibres as "composed of cellulose" is misleading. In the cotton substance the non-cellulose, it is true, is small in proportion, but the composition of the *eriodendron floss*, as of other seed hairs, is widely divergent. Later in the section we find the bast fibres described as made up of cells of which the "walls are composed of more or less thickened lignin or woody material." This is quite inaccurate in regard to the most important of them viz. flax, hemp and rhea. Again, the good "commercial qualities" of the fibro-vascular bundles of monocotyledons ' depends upon their moderate length, strength, flexibility, and the number of fibre cells in each bundle. Without reference to the grammatical slip, we will fix the looseness of the phraseology by transposing the terms to another case. "The good commercial qualities of gold depend upon its moderately yellow colour, specific gravity, ductility, and the number of silver coins of equivalent value"?

We have dealt with this section on "Physical and Chemical Properties" at disproportionate length, for the author exhausts it in a single page of matter. The failure to lay a solid critical foundation by an adequate treatment of the section, of obviously fundamental import, measures the failure of the work to contribute to the systematic development of the subject. We are bound, further, to particularise some strange inaccuracies in the information conveyed to the perhaps unsuspecting reader. Jute is described under the heading "Jute, Common," and the description contains many curious statements. Thus:—

"The fibres are several feet in length, have a satiny lustre on account of which they are sometimes used in the manufacture of the cheaper silks."

There is a popular confusion, we presume, between ute and "jute"; there is also a slang word "water" well known, "in the city" but we suggest that only in the official mind of a judge of the High Court would there be any possible confusion of the material with the immaterial "water." So we venture to think that the author has served up a popular error in relation to "jute" as an industrial fact in relation to jute.

In particularising the applications of jute yarns we find,

"the backing of hearthrugs, the lining of ladies, slippers, the collars of gentlemen's coats and burlaps for bales of jute or hemp coverings."

We refer the author to Dundee for information. Lastly, "the jute fibre readily dissolves in alkalies and mineral acids at a low temperature." The reader may correct this statement by reference to any of the standard works on cellulose chemistry. The chemistry of the fibre substances is dealt with generally in a superficial way. The author should have been careful to avoid such statements as the following in reference to cotton (p. 91):—

"Acids have so destructive an effect upon cotton that their use in the cotton industry ought generally to be dispensed with since alkalies such as soap . . . can be employed for scouring and cleaning cotton fibres without materially injuring them."

And again (p. 97),

"Cotton fibres have some affinity for vegetable dye stuffs such as Indigo . . . but little or none for coal-tar dyes." The section on "Cotton" otherwise contains useful information of a conventional commercial order, and as it comprises some forty-five pages is clearly the most important of the book. In the categorical description of the various cottons, the dimensions are given in inches and fractions of an inch. This in a scientific text-book is a gratuitous concession to the rigid conservatism of our industrial system. We should like to ask if the expression 1/1180 inch conveys any definite mental impression to the reader?

We briefly notice the section "Paper Fibre Plants." We all know that paper can be made from an endless variety of fibrous materials, and the author is evidently more impressed with the fact than with the advantage of using the qualifying term "commercial" as a winnow for separating the grain from the chaff. The paper maker will find the section of little practical importance. The subsection "Woodpulp" opens with the curious sentence, "This is rather confused and mixed up with paper-making." The remainder of the section may be similarly described. A subsection on "Woodpulp silk" is rather out of place at the conclusion of the section on "Silk." The treatment of this highly important industry indicates that it lies outside the author's range of experience and does not invite serious criticism.

The author is entitled to the credit of having produced an interesting book on a universally attractive subject. That it does not take the place of a standard text-book of critical importance is due to the fact that he has not sufficiently grasped the trend of the progressive scientific movement which underlies the many-sided "commercial" developments of the fibre industries,—*The Nature.*

THE PAPAYA AND HOW TO GROW IT.

The fruit called the Papaya or Papow is so well known in India that I feel some diffidence writing about it.

The papaya tree belongs to the natural order *Papayaceæ* several species of which are remarkable for their poisonous properties. The Papaya itself has long been known as an excellent fruit yielder, and recently the fruit has become very popular with Europeans in India. It is believed to be a native of Tropical South America, but is naturalised in India. Some weird and wonderful properties are assigned to this tree. For instance, it has been stated that tough meat wrapped in its leaves and kept for a few hours, is rendered tender and toothsome. Of course, this is one of those stories that will not be killed. Scientists have however, found that the fruit contains a substance called papain, which, like pepsine, has the power of helping digestion of food. And as dyspepsia is one of the ailments from which modern humanity suffers considerably, the fruit of the Papaya tree should become very popular with those afflicted with a weak digestion. But apart from this important property, the fruit is not only wholesome and beneficial, but is of a flavour and consistency which cannot fail to commend it to the consumer. Unfortunately, in India, this fruit like many others, is grown in such a haphazard manner, that its peculiar flavour and delicacy are not developed, and the consumer is obliged to be content with the insipid fruit commonly met with in the bazaars.

Now there is no reason why the consumer should not Papaya fruit of good quality. It is a very simple matter. The tree can be raised from seed sown during the rainy reason; and the plants so raised will yield fruit of good quality the following year. The tree is of very rapid growth. The point to be kept in view is to sow seed obtained from really good fruit *ripened on the tree.*

It is, of course, well known that natives pluck the fruit in a green state and ripen it artifically. This system is responsible for the absence of flavour and quality so common in the fruit sold in the bazaars. If the readers of *Indian Gardening and Planting* will observe the following directions, every one may grow and gather his or her own Papayas of really good quality.

Firstly, obtain seed of good variety from the Superintendent of the State Gardens, Bangalore. Sow the seed in pots or pans in common garden soil, say in July. As soon as the young plants are about six inches high, transplant them simply into 12 inch pots, filled with a fairly rich soil. When these pots are filled with roots, transfer the plants bodily to ordinary tubs, or the largest sized pots obtainable, filled with good, rich soil. Water them in dry weather and let them grow. If you have sufficient ground, put out the young plants into the open, in rich soil, and water in dry weather. In the following April and May you may gather your fruit and enjoy a really good Papaya. The tree fruits well when grown in tubs or large pots. In order to get fruits of large size, it is necessary to thin them out, and so give them a chance of swelling and developing.

The reason why I have recommended the procuring of seed from Bangalore is that it is the best variety of Papaya I have yet seen.

There is one point, however, which the grower must make himself acquainted with. The Papaya tree carries the male and female on separate trees. The male tree bears its flowers in large loose bunches which hang down, and the stems on which the flowers are borne are from one to three feet long. The female tree bears stemless flowers, attached close to the main stem or trunk of the tree. Therefore, as soon as the trees show flowers. all the male trees, except one, should be uprooted and thrown away. Some trees bear what botanists call "hermaphrodite' flowers, that is, they carry the two sexes in the same flower. These are no good as fruit bearers and should be treated as males and thrown away unless you wish to grow a plant or two as a curiosity. It is important to bear the foregoing in mind and thus avoid much disappointment. I have often heard my friends say that their Papaya trees never bear fruit, though they are covered with flowers. On looking at them, I have always found the trees to belong to the 'male persuasion.'

If you like the Papaya fruit and wish to get it of good quality follow the foregoing hints. There is no reason why everyone should not have his or her own Papaya trees in pots and tubs if there is no garden or grounds to grow the tree in. The tree fruits in one year from time of sowing the seed, so it is easy enough.

AMATEUR GARDENER.
The Indian Agriculturist.

BUDDED AND SEEDLING ORANGE TREES.

BUDDED ORANGE TREES ARE DYING OUT BY SCORES IN SOME GROVES, WHILE THE GOOD OLD SEEDLINGS IN THE PASTURES GO ON BEARING MERRILY.—LETTER FROM CORRESPONDENT.

Although the practice of using budded citrus trees has become generally adopted in the island, there are still a great many who look askance at the innovation, and remain staunch in their belief that seedlings make the most reliable and best trees. They point to seedling orange trees, self-grown, half wild unattended, uncultivated, which have been bearing steadily as far back, perhaps, as they remember; strong, upstanding, healthy trees proof against scale insects, against drought, or wet, dieback or footroot, blight or beetles. And they compare *such* (note the *such*) seedlings common everywhere in woodland and pasture, with *certain* budded trees in *certain* groves, (note the *certain*) grown from seed, sown in beds, transplanted, and well tended then transplanted to a nursery, budded, kept clean, and then planted out in a grove, where they are kept hoed fairly clean, forked round, limed, perhaps and manured and yet in two or three years, snails and beetles attack the leaves, grubs eat the roots, scale insects infest the whole tree, so that washing and spraying are begun as a necessary part of the cultivation or else the trees die out. Even with all such attention many trees die. This is all apparently plain, as is pointed out by many who do not believe in new fangled things (though the "new" things are often methods as old as the Pyramids), and often the planter of budded trees can only feebly excuse himself to the enthusiastic advocate of things as they were, and seedling trees, by saying he will get a crop in three or four years against the seedling man's seven or eight, and that his will come true while the seedling tree may turn out half-sour.

Now let us bring common sense only to bear on this subject, and leave out all thought of mystery and magic, fads and fancies, theories and tall talk.

The stout seedling tree in the pasture, never cultivated, yet, proof against disease, and always bearing well, has germinated as the fittest of a million seeds deposited on the soil around has grown from thousands that sprang through the soil, has survived of hundreds of young trees that grew up, has alone reached bearing of scores of its companions, has kept on bearing of dozens that bore fruit and afterwards died out. Between this stray tree and the neighbouring strong orange tree, may be a space of 50 or 60 feet, and between, bush of many kinds, a pear, a breadfruit, an ackee, and so on. It invariably happens where there are clumps of seedling trees or two or three close together, that they are infested with parasites and pests of some kind, and are poor trees, only their great grip of the soil up-keeping them. Almost every tree, or plant has its peculiar pests, and as a rule these do not prey indiscriminately upon plants of opposite characteristics so that when there is some inimical scale on an orange tree, and that tree is well separated by other trees from neighbours, there is not much chance of one particular pest, spreading fast or gaining the upper hand, for there is also likely to be some specific enmies preying upon it, enemies that may also be on the other kinds of trees between, ready to intercept it. Or if there does happen to be an indiscriminate pest, there are also sure to be many enemies to prey upon it. It is this mixing up of economic plants in Jamaica, this apparently hopeless muddle of coffee cocoa, orange, breadfruit, pear ackee, bananas, plantains, etc., all through each other that has actually saved the island from the trouble, annoyance and loss through insect pests and diseases, that agriculturists in other lands have suffered and are suffering from. California and Florida suffer heavily from these, and large sums have to be spent yearly in combating them. In Ceylon, where there were miles upon miles of land under coffee alone, plantation after plantation adjoining, beautifully planted and well kept, the coffee industry was ruined by a leaf disease, and the planters took to tea and cocoa. Now the cocoa trees have caused serious anxiety through dying out from a widespread and general disease, so that the loss was calculated at 15 to 20 per cent. of the annual crop, and a specialist had to be engaged to make minute investigations into the matter. Here, we have not had, with the exception of sugar and bananas, large stretches planted to one kind of plant alone, an estate after estate adjoining, growing one and the same product. But lately, we have had groves of orange trees set out, row upon row of nothing but orange trees. Hence, as in other orange growing countries, these are excellent nurseries for the specific scale insects and other pests that feed upon citrus plants; and more than that, the various grubs and slugs that lurk in the soil especially about rotten wood, finding every other thing cleared off, have therefore to feed upon what they can get. Even if they had never before touched the roots of orange trees it is certain that necessity, especially through hunger, knows no law, and they would quickly adapt their tastes to what they could get. Hence the troubles of our orange growers, who finds insects of various kinds feeding on their trees, and injuring them, and grubs—the larvæ of various beetles, but particularly the "Fidler" beetles and their larvæ the "makaka" grubs—feeding on the roots of the orange trees. The larvæ formerly found plenty of rotten wood, in some form or other in the ground; now they can find almost nothing but roots of orange trees. If these were entirely strong and healthy they would probably not touch them; but they find some injured, or bruised or diseased from some cause and they immediately find feeding ground. They are probably voracious too, from their numbers and the scarcity of food, and a small abrasion of a root that where enemies were not instantly on the spot to attack, would likely have healed quickly in a healthy tree and in sweet soil, is instantly attacked So that above and below our orange trees find enemies. But, we should fancy the enemies of these pests should increase proportionately? Yes perhaps if we all knew what these

were; but it so happens, that we ourselves have seen the deadliest enemy of scale insects destroyed as an "ugly red bug," both by picking off and spraying, namely the lady bird beetle, the same insect that Californians hunted the world to get found one kind in, and introduced it from, Australia and which saved their orange groves from destruction by the "San Jose Scale," while lately after searching the world through they have found a more voracious species of "Ladybird" in the heart of China. There may be other friends of our trees insects or birds unknown to us, which get scant mercy at our hands. Is not all this worthy of special study and investigation, by an entomologist? I daresay in saving the cost of an entomologist, we are losing one hundred times as much in the time and labour involved, in every man attempting to being his own doctor of his trees and still losing them. We have doctors for men, another branch for horses and cattle, so why not a plant doctor? It is hard to see scores of trees that have just reached bearing age, dying out; but it is just at the stage when the great call is made on the constitution of the tree, that its weakness become apparent, and it cannot stand the strain. The whole trouble, we think can be traced. It is not in the fact of budding or grafting, for the bud is part of another tree and if there is any weakness in its constitution that can *only* affect the top of the tree, while our most serious trouble is at the roots, and these roots art those of the stock, grown from a seed. It is in fact *seedling sour* orange trees that are dying out in out groves from root troubles, exactly what the advocates of seedling trees forget. The sweet seedling trees in wood and pasture are subject to exactly the same, and to all d seases that the budded trees in groves suffer from, and every day some are dying out: you can see them diseased and decaying on every estate, only certain of the very fittest almost disease-proof surviving, as we have pointed out, and there is in every cultivated grove always the same thing, certain stout, strong, healthy trees, that cannot be killed. But never having had much, if any money, spent on them, and little or no care, these dead or dying seedlings are not particularly noticed. Still they do not suffer as much from disease of the roots as do budded trees; that is evident; wild self-planted seedlings are diseased above ground, seldom below, while it is the opposite with most of the budded trees the growth of which is so unsatisfactory in many places. Is it not evident from this that there is some fault in the transplanting and in the treatment generally of these grove trees. The fact is, the whole operations from planting the seed in a nursery on, have been bad. The self-sown seedling select themselves by the fittest surviving; but no selection has been made by the planter, as a rule. He has not chosen the sour orange tree that was perfect and free from disease, and well loaded with large fruit; nor has he chosen the plumpest seed from these fruits. We question whether in transplanting the small seedling trees from a bed to a nursery, the treatment has been such as could be calculated to make them strong and vigorous. Both in off nursery beds and in groves—and generally with all our horticultural operations,—the ground has been too quickly and roughly prepared. It is mainly old fallow ground, which is cleared, holes dug, and trees put in all in a week. The soil with this treatment cannot be in condition for tender trees to make growth,—tender, for all trasplanted trees are tender, and the soil must be of the sweetest and finest for the cut surfaces to heal and put forth the little feeble roots to take food material, and they consequently get a bad start. But a seedling never interferred with grows slowly and steadily, its tap root is deep down; as it puts forth a fresh root, it is seeding all the time through a hundred others. Our treatment therefore has not been tender enough, has been too rough and ready. When deep planting is added to this, the death of the tree is certain. What is required is to plant fewer trees, and take more time in all the cultural operations from the beginning, for what does it profit to have ground cleared, holes dug, and 5,000 trees might be looked over that are bound to give trouble and anxiety and loss later, when 1,000 trees very carefully and minutely looked after will probably give as a large a return. There is far more money in 100 trees bearing 1,000 oranges each than in 1,000 trees bearing only 100, and poor ones at that. We also want a special study made to find the most deadly enemies to our greatest pests; what for instance would prey most upon Fidler beetles, and what upon their larvæ the oily "makakas?" At present the only enemies to the "makaka" we know are poultry, and young pigs, let loose in the grove, and these rout and scrape these grubs up. If the roots are thoroughly healthy the tops will never likely die off mysteriously. Spraying the foliage and branches for all sorts of diseases is not an unmixed blessing if you kill off the lady birds which are so valiant in our interests. Without healthy roots there can be no healthy tree. The proper preparation of the soil and the careful planting of the young trees are things to be looked upon with respect. To dig a row of holes in raw soils and get any odd worker about the place to stick the trees in up to the bud as fast as the holes were dug was the general style of planting some of these very trees that are now dying out. There is a science in planting trees that may not be learned in a day, however easy it looks—*Journal of the Jamaica Agricultural Society.*

CULTIVATION OF SUN FLOWERS.

The first year of the twentieth century closed with a curious sale, on the Baltic, of a cargo of sunflower seeds, which changed hands at £11 5s. per ton. Though a small trade has been done in sunflower seeds for close on 200 years, this transaction was the first in which a whole cargo—300 tons from Odessa—was dealt with. In Russia, where the cultivation of the sunflower and the manufacture of oil from its seed is conducted on a large scale, the Grandi Flora is the variety grown. The species rises in a slender stalk of 5ft. high, producing one monster head, the average yield being as much as fifty bushels of seed to the acre. So rich is it in oil that that quantity of seed will yield fifty gallons of oil; while the refuse of the seed, after the quantity of oil has been expressed, weighs 1,500 lb. when made into cattle cakes. Few people in England who grow the sunflower for ornament have any idea of its usefulness. It is among neglected crops in which there is money, as is shown by the price paid a few days ago. Besides the seed, every other portion of the plant can be utilised. The leaves furnish an excellent fodder; while in Russia the stalks are prized as fuel, and their ashes, which contain 10 per cent, of potash, are readily sold to soapmakers. Naturally, in Russia the chief virtue of the sunflower lies in oil contained in its seed. The oil is of a clear pale yellow colour, almost inodorous, and of an agreeable, mild taste, so that it is in great request as a table article. Why sunflowers are not cultivated on an extensive scale in England, it is difficult to say. Poultry and cattle like the seed either in its natural state or crushed and made into cakes. No plant produces such fine honey and wax; when the flower is in bloom the bees abound in it.—*Journal of the Department of Agriculture of Western Australia.*

A Large Indian Melon.—A very fine fruit of the Indian Melon (Cucumis Melo var. momordica) was grown at Government House, Singapore, in sandy soil. It was dark green, mottled with lighter colour, and weighed 16½ lb., with a length of 2 feet 3 inches and a circumference at the broadest end of 1 foot 10 inches. It had not much flavour, but is said to be very wholesome, and is an important article of food in India.—*Gardeners' Chronicle.*

VANILLA GROWING, AND CURING.

[For the following Essay we are indebted to Mr. A McFarlane, Planter of Tahiti. The work bears the marks of practical experience, and as a record of such will doubtless be welcome to many who are attempting to grow this plant in the West Indies. Mr. McFarlane remarks that after many years practical work he "*does not claim to know all about the subject.*" His modesty is commendable, but it will be patent to most cultivators by a perusal of his Essay, that his knowledge of tho methods adopted in successful cultivation, is well worthy of being put on record, for the benefit and instruction of those who have been less favoured in opportunities of obtaining information. —ED.]

VANILLA.

The Plant Vanilla is produced by a terrestrial, climbing vine, belonging to the Orchid family, having the oddly-shaped flower of its family, and like many of its relatives lacks the power of self-fertilisation. This can be learned from any encyclopædia. Here I learned as a beginner that there was but one variety, and that the reason why Tahiti Vanilla only brought about one quarter the price of the same article grown in Mexico, was in the difference in the soils, the soil of Tahiti containing some deleterious ingredient, which changed the odour. I never could understand this statement, as I knew that the best Mexican Vanilla grows on volcanic soil, and Reunion, which produces a very superior quality, only second to that of Mexico, is of volcanic formation as is also Tahiti. I have since then learned that we have three varieties, all of course imported as Vanilla is not indigenous to any of these islands. "La Vanille"* mentions eight varieties, five of which are indigenous to Mexico. The three varieties which we have, are *Vanilla planifolia V. sylvatica*, and *V. pompona*. This last yields the Tahiti Vanilla, known in Mexico as Vanillon and in the English market as Vanillos, *V. planifolia*, here yields a bean equal to that grown in Reunion, but is not grown to any appreciable extent, and I only know of a few vines of *V. sylvatica*. Although all of these varieties were imported at the same time. *V. pompona* quickly recommended itself to the Kanaka planter, with the result that the others were discarded and what few plants of them were left were only to be found in some deserted plantation, while *V. pompona* was rapidly distributed over Tahiti and the adjacent islands.

Now, a few plantations of *V. planifolia* have been started, since we have learned its value. To describe the vines as they appear to me (an entirely unscientific description), *V. planifolia* is very distinct, the stems are large, as large as the little finger, and the leaves are short and broad. The vines does not grow as rapidly as do the other two. The bean is long, thin and round, and the blossom end is at a sharp angle to the bean The blossom end of *V. pompona* is at right angles, or nearly so, to the bean, and there is a decided difference in odour, (a decisive test if beans of the two varieties should happen to be mixed) *V. sylvatica* and *V. pompona* and very similar in habit, with long narrow leaves, of rapid growth, slightly dissimilar in the flowers, but the difference is very marked in the fruit. *V. pompona* has short thick beans which can be left on the vine until they become brown while *V. sylvatica* has a very long bean which splits badly and has to be gathered early, in order to save it. In odour it more nearly approaches *V. planifolia.* The stems of *V. pompona* are only about half as large as those of *V. planifolia* and the joints are longer.

THE PLANTATION.

THE SITE.—It is in the selection of this that the greatest care has to be exercised. From the nature of the vine it is at once seen that it will not thrive everywhere, although to look at the various plantations in Tahiti one would imagine that the native grower thinks it will. Here it is planted upon every conceivable sort of soil from swamp to sand, and with any tree, shrub, post or rock, that may be most convenient for a support. Of course with such treatment it cannot be expected to yield a good return. I claim that the steep little valleys with which these islands abound, are an ideal home for the vine, and have proved it (at least to my own satisfaction) on my own plantation which is in one of these valleys, and although only about half a mile from the sea and a couple of hundred feet above it, my beans average over an inch longer than those grown close to the beach or on flat undrained soil. Vanilla revels in moisture (but it wants no stagnant water about its roots) and the hill side plantation gives it that. Heavy dews, more or less moisture constantly descending from the hills above, almost obviate the necessity of rain, while the natural drainage keeps the ground always sweet, no matter how heavy or how prolonged a rain may be. The vine also delights to send its roots around and among rocks, probably in search of nutriment and moisture. Of course, the advocates of planting on low level ground have many arguments in their favour such as ease of working, possibility or rather certainty of getting more plants on equal sized pieces of ground and probably of getting a larger weight of beans. These and any other claims which may be advanced I contend are more than balanced by the fact that the Vanilla on the hill sides is in, as nearly as possible, its natural condition; that the vine looks stronger and healthier, and should be in better condition to withstand disease and finally, that the beans certainly are no longer, and that the largest beans command the best price. My advice is, eschew level ground, select a piece with a moderate slope for ease of working (as Vanilla does not care how steep the ground may be but the work man does) and let it be if possible in a valley not of too great extent.

After the ground is located, it is necessary to prepare it for planting. There are two ways of starting a plantation. The first is to cut away such of the trees originally growing upon the land as may be necessary, saving such as may be required for shade or to plant the vines upon filling in the gaps with posts. The second is to chop everything off the ground and to plant posts (of such trees as will grow from cuttings) or young tree plants at regular intervals. The second plan gives the prettiest plantation and when once established requires less labour in keeping it in condition, but takes longer in the first place before it brings in any returns. Besides the original cost is more. Whatever plan is adopted, never resort to fire as an aid in the clearing. Chop all the trees and branches into small pieces and leave them to rot on the ground as food for the Vanilla.

As to what variety of tree is the best to use as a support, I have tried a number, and have found several that I like, and also some, recommended by others, which I do not like. I would advice trying the trees indigenous to the place where the plantation is to be started as it is certain that some of the native trees would prove suitable. The best tree is one which will grow from "cuttings." That is one the majority of pieces cut from which will grow when planted—posts to be from three to eight inches in diameter and seven or eight feet long. One which is a moderate grower, which takes a good hold of the soil and which does not give too dense a shade. All these requisities I have found in one of our native trees, the botanical name of which, unfortunately, I do not know. The following are recommended in "La Vanille":—*Mango, Acacia Lebbek, Pterocarpus indicus, Artocarpus integrifolia Eriobotrya japonica, Laurus persea, Bombax malabaricum, Ficus elastica* and *indica, Jatropha Carcas Dracæna tesselata* and *Jatropha Manihot.* "The three salt are employed in plantations exposed to the sun and without shade, grow rapidly and furnish plenty

* To a valuable little work, published by the French Government in Tahiti (La Vanille, by Dr. A. Delteil), I am indebted for such statements as I have made regarding the culture, methods of curing, etc, pursued in other countries than Tahiti.

of good shade." Of these I have only tried one or two. I have been told that in Fiji, the only plant which will carry the Vanilla through a hurricane is the Croton Oil plant, *Croton tiglium*. I do not like it. Its stems look too much like those of a cabbage and it appears to be short-lived. My favourite trees, besides the native one already mentioned are *Bauhinia purpuea* and *Bixa orellana*. The bixa gives the deeper shade of the two. Both grow easily and rapidly from seed and make good supports in from eighteen months to two years after planting. The candle nut tree of these islands also makes a good post.

Six by eight, or eight by eight feet is a good distance to leave between the posts. I have seen them at four foot intervals and also the Vanilla planted on fences or trellises, but the posts at four feet are much too close together and trellises when they begin to rot and fail entail too much labour in the replacing. In fact it is hardly worth while to try and replace Vanilla which has fallen with a post, let alone a wall of it. I have spent hours in replacing posts which have rotted and putting the vines upon the new posts and have never made a satisfactory job of it. Of course it is sometimes necessary in order to save such immature beans as may be on the vine when it falls, but for future use I would prefer to root out the old vine and plant a new one. Here I refer to vines of three or four years' growth which is about the time that trellises and dead wood posts take to rot here. Where wood eating insects are had, only live posts should be used.

While the plantation has been preparing, a stock of vines should have been provided. Here we have no trouble as any quantity is to be had for the cutting but in starting a plantation in a place where no old plantations were "come-at-able" it might be necessary to have recourse to growing them from seed. This I have never tried, but I give the method recommended in "La Vanille." "The seeds are extracted from the bean placed in a cloth and washed many times with strong soap-suds, in order to remove the greasy matter which envelopes them. They are then exposed to the sun until dry and when dry are mixed with fine sand or ashes to seperate the grains. They are then sowed in a box on a soil composed of equal parts of humus, sand and fern soil (terre de scolopenдre) which has been well mixed and passed through a fine seive. With care in watering and a moderate exposure to the sun it is possible to obtain the yong plants." Where a limited number of vines only are to be had, they may be cut into lengths of three or four joints and planted in a bed composed of decayed and partially decayed leaves and leaf mould. By keeping them well matured and shaded, in a couple of months they will have made good roots and can be removed to the plantation. This is preferable to planting small cuttings at once in place. Such plants will not give a crop under two, or two and a half years. The plan followed here is to plant vines of three or four yards in length. These will give a few beans in a year or eighteen months from the time of planting. Some people claim that by using such long vines, the resulting plaut is weaker than one produced from short cuttings, but I have not found it so.

At any rate whether a vine of six joints or one of six yards is to be planted the method to be followed is the same. A slanting hole is made about a foot from the post and a couple of inches in depth. Into this the end of the vine is inserted, and the soil pressed tightly around it. The vine is then laid flat on the ground from the hole to the post and tied to the post. The part upon the ground should be of a length of two or three joints. This is thickly covered with rotten and dead leaves and rotten wood, and on top of all one or two stones to keep the vine and its covering in place. While the vine emits roots and its cut end still the strongest roots are sent out at the joints, hence the necessity of covering one or two of these. The best time to plant is at the beginning of the rainy season.

I have seen it seriously stated that a hole two feet deep should be made and the vine planted in that. This I do not recommend, as the Vanilla is essentially a surface feeder, the roots spreading between the soil proper and the layer of decaying matter which covers it. On this account it is not only unnecessary to dig or plough the ground, but I believe positively hurtful. It is on the contrary very necessary to keep the surface covered with decaying vegetable matter, and if the trees supporting and shading the vines do not yield sufficient material, then manuring should be resorted to. That is by applying a coating of rotting material such as the leaves and stumps of bananas, coconut leaves, stable manure, guano, &c. Artificial manure should not be used. Although doubtless much nicer looking I do not like a "clean" plantation. By this I mean one which is kept weeded. I prefer to have mine well covered with weeds of various sorts. These act as a mulch for the surface feeding roots of the vanilla, a very good thing in a dry spell, and the deep rooting varieties are constantly bringing up nourishment from the deeper layers of soil which the roots of the vanilla do not reach, converting it into food (in the shape of their fallen leaves, &c.), which the Vanilla can assimilate and placing it where it will be likely to do most good, thus constantly manuring the vine. *Tradescantias* although surface feeders, act as a mulch, and keeps the ground cool and moist, and where I have seen it, the Vanilla seems to thrive. After the vines are planted all the care that the plantation requires, until the blooming begins, is to keep the growing posts pruned, and in case any of the vines grow too high to turn them down. On short posts and trees of course the Vanilla turns down of its own accord, but on the taller trees it must not be allowed to travel out of reach. The turning down is *a most important operation* (Ed. Italics), and must not be neglected. The plantation should be gone over at least every two months and vines which have reached a height of ten or twelve feet should be carefully loosened from the tree, for the upper half of their length and hung over convenient branches. These hanging wines are the ones which produce the flowers. Hence, the necessity of turning down. *As long as the vine can continue climbing it will not bloom.* Do not let the vine hang nearer than a foot from the ground. Pinch in the end when it has reached that length. The vines have in climbing wrapped their tendrils around their support, and some authorities direct that great care must be exercised in loosening them so that they may not be injured. From this I differ. After the vine is sepearated from the tree the tendrils have no further work to do and are of no further use to the vine, consequently, when letting down I simply cut them off close to the vine thereby saving time and in many cases the vine also when a tendril is wrapped two or three times around a twig it takes time to remove and often, as the vine is much the more brittle of the two it is broken before the tendril is cleared.

PRUNING.—It is the same with Vanilla as with fruit trees. When they run too much to wood they do not give a full crop of fruit. In consequence rank growing vines have to be kept within bounds with the knife. The plant is also benefited by removing the old vines which have fruited. These may only have given two or three bunches of beans and may still have several buds left on them which might produce flowers, but if cut off close to the top of the post, the plant will replace them with one of the full necessary length by next flowering season, which will give more bloom than the old one would have done and probably produce better beans. For the turning down and pruning a small portable step ladder is useful.

FERTILISING.

Here *V. pompona* gives two crops of flowers in the year, and occasionally a few flowers at other seasons. The main or largest flowering season begins

about the first or middle of July and lasts until September. The second begins usually in January and runs through February into March. This flowering gives the longest beans. This is doubtless owing to the fact that the July bloom comes in mid-winter and the cold checks the growth of the bean. In Tubuai, one of the Austral Group, four hundred miles south of these islands and where a limited quantity of Vanilla is grown, the July crop is frequently a failure, a succession of Southerly winds causing the flowers to drop from the vine.

V. planifolia blooms only once, the season lasting from September, through October and into November.

During the height of the blooming season, the planter must procure extra labour, as the flowers remain open but one day, and all have to be fertilised on that day. Here we principally employ women and girls as they are more nimble-fingered and quicker than men. The flowers are very erratic in their opening. Some days the bunches may have two or three flowers open and the work people will be taxed to finish by three p. m., at which time the flowers begin to close. Upon another day there will be but a scattering of bloom, and the day's work will be ended by ten or eleven a.m.

The following record of my last flowering will give some idea of this variation:—

Jan.	24	540	Feb.	7	Rain	Feb.	21	12,500
,,	25	520	,,	8*	300	,,	22	6.940
,,	27	1,080	,,	10	2,320	,,	24	14,740
,,	28	960	,,	11	460	,,	25	9,620
,,	29	1,000	,,	12	2,440	,,	26	7,340
,,	30	1,820	,,	13	2,200	,,	27*	8,040
,,	31	1,400	,,	14*	3,120	,,	28*	3,600
Feb.	1	Rain	,,	15	5,980	March	1*	2.360
,,	3	None	,,	17	48,40	,,	3	4,920
,,	4	1.560	,,	18*	4,060	,,	4	3,240
,,	5	1,200	,,	19*	5,840	,,	5	2,800
,,	6	2,140	,,	20	8,220	,,	6	1,700
							7	1,280

On the days marked with a star, worked was stopped by rain. Febuary 3 was a most remarkable day as there were absolutely no flowers open upon any of the plantations in this neighbourhood.

Many statements are extant regarding the number of flowers that a single individual can fertilise in a day.* These range all the way from one to six thousand. This last figure is regarded as quite fallacious as it is not considered possible that it can be reached. Experience teaches that a quick worker with vines growing close together and in heavy bloom, can fertilise three thousand in the day, but I think that is about the limit. Two thousand three hundred is my best day's work, and it meant a hard day From fifteen hundred to two thousand is a good average.†

The operation is simpleness itself and can be learned in five minutes if one has the opportunity of watching one who already knows how. To explain it in writing is more difficult. In the first place the only tool required is a small pointed stick, similar in size and shape to a wooden toothpick. This can be made of almost anything in the shape of wood; and is so made by the Kanakas. The best however is either a silver of bamboo, or the mid-rib of a coconut leaflet, sharpened at both ends (this simply for convenience as then it does not matter which end is uppermost in the hand). We make half a dozen in advance and carry them stuck in our hats and if one is dropped, no time is lost in looking for it, but another pulled out of the hat. As to the operation itself. Holding the flower in the left hand, the "petticoat" or lip is stripped down, exposing the column, the top of which is then held between the finger and thumb. The point of the operating stick is now drawn upward, raising the cover of the stigma and the anther, which by a gentle pressure of the finger and thumb holding the column are kept open, while with the point of the stick the pollen mass is removed from the anther and placed under the cover of the stigma. The pressure of the fingers being removed this flies back into place and holds the pollen securely and the flower is fertilised. By this method the operator sees that the mass of pollen reaches the stigma. Another method which is slightly more rapid is the following: A very thin stick is used. Instead of using the point the side is made use of. With this, the cover of the stigma is raised and pressed flat against the column under the anther, which is then pressed downward by the thumb and by this pressure the pollen mass is transferred to the stigma. My objection to this method (I won't allow it to be used on my flowers) is that the operator does not see the pollen enter the opening of the stigma. It ought to and in most cases does, but sometimes fails to remain and the flower is lost. With the other method every part of the operation is visible and there is no possibility of making a mistake. The difference in rapidity is but slight and is more than made up by the certainty of the first method. It requires but a very slight touch to disengage the pollen mass from the anther, and it adheres to the stick not one in a hundred falling. When placed on the stigma it at once leaves the stick as there is an adhesive substance which retains it. The planter who has several work-people fertilising his flowers will do well to occasionally examine flowers which have been finished, in order to see that the pollen has been placed upon the stigma. It has frequently happened here that, when a woman has been behind or is in a hurry to finish, she simply breaks the "petticoat" and goes on, leaving the flower unfertile, although to outward appearance properly finished.

The flower is upon the end of a slim round stem, usually about two inches long. This is the bean in embryo, and is upright while the flower is open, but upon the following day is found to have bent over and to be hanging down. By the second or third day there is no mistaking the flowers which have taken. If the operation is carefully performed, very few fail. The bean in the meantime will have grown sensibly longer, and the petals have withered about the column. In the case of an unfertilised flower, the column falls off together with the faded flower. The column remains attached to the growing bean until it is nearly ripe, that is for seven or eight months. There are, however, exceptions. Flowers fertilised late in the day, say after three o'clock or when they have begun to close, will still take, but I am of opinion that they are responsible for a number of the beans, the columns of which have fallen off. Sometimes a bean has only grown two or three inches long when its column falls off. This appears to have an evil effect upon the future growth, for while the bean continues on the vine and eventually ripens with the others, it is always short. I have never yet seen a long bean which had lost its column early in its growth. There may be a spell of rainy weather just when the vines are in bloom. A little rain makes no difference, but a heavy downpour of half an hour or more causes the pollen to run, an instead of a dry mass put upon the stigma, it is a kind of yellow soup. These or some of these beans take, but the softened pollen masses have not apparently given them the necessary amount of vitality to carry them to full growth and the column drops off. In fact it indicates partial fertilisation.

From the time the flower is fertilised the bean grows very rapidly, attaining its full length in about three months. Thus upon one bunch the first bean may have attained a length of four or five inches before the last flower blooms. This is the time to see that they grow in the way they should go. In turning from the upright position of the flower

* *Taking the day as eight hours, viz., from seven a.m. to three p.m.*

† *In the height of the season we breakfast when the flowers are finished.*

to the pendant one of the growing bean, the bean often turns over a branch or leaf or the withering flower sticks to something thus preventing the bean from hanging straight. This makes a crooked bean and crooked beans invariably lead to crooked language on the part of the curer, when he has to tie them into bundles. Unless taken in hand young there is no hope straightening these crooked ones, so each bunch should be looked over several times during the fertilising season and the beans arranged so that they can grow straight.

The flowering shoots appear at the axils of the leaves, and on each of these shoots are from five to twenty five flowers.* Authorities differ as to the number of flowers which should be fertilised but I think all are of the opinion that some of the last flowers should be removed. Here the planter must use his own judgement. While one vine may be able to carry ten beans to a bunch, another might have difficulty in carrying three. No hard and fast rule should be set. In my practice with *V. pompona* I fertilise from eight to fifteen flowers on a bunch and latter reduce them to anywhere from six to twelve beans by removing the shortest beans. I like to have about one fifth more flowers fertilise than I intend to have beans just for this purpose of selection. *V. Planifolia* should have fewer beans left, never more than eight to a bunch. In our market all beans are bought at one price, so it is not very necessary for the grower to be very particular in cutting the short ones Had I to sell my beans in a market where an increased price was paid for the longest beans, I would leave yet fewer on the vines than I have recommended.—*Trinidad Bulletin for August.*

(To be continued.)

GERMAN SOUTH WEST AFRICA.

NATIVE VEGETATION.

I am sending you a small bag containing seeds of the so-called Caffir Water-Melon, a variety of Citrullus vulgaris, largely grown by the Hereros in Okahandya, and many other places in Hereroland. [Sent to Chiswick. Ed.]. The whites do not cultivate it. Whilst I was there, two months ago, no Water-Melons were to be bought; the Caffir Water-Melon being very late, is but now beginning to ripen. Caffir Water-Melons can be found in the native gardens of Okahandya in various forms, differing in shape, colour and weight, but I believe not in the seeds, the colour of these being always red, but never black or white, at least I saw red ones only. You will find the seeds rather larger than those of our sweet varieties. The weight of Caffir Mellons of all the three or four varieties is generally 6 to 10 kilograms. The flesh is very solid, and when not fully ripe and still tender, it may well be used instead of Cucumber, which is not easy to cultivate; the female flowers are generally fertilised by a fly. The ripe fruits remain hard, and are not sweet, but they may be kept four months in a dry room without rotting. The Hereros slice them, and dry the slices in the sun for winter provision. As required, the dry slices are boiled with water to a soup.

In the dry east rn red sandy region (O nahek) which forms part of the Kalachari, there grows in many places in masses, the so-called "Sweet Dachammas" the common or bitter Dachammas is Citrullus vulgaris, the ancestor of our sweet Water-Melons), which is not at all sweet, but is at any rate perfectly free from colocuinth flavour, as is the cultivated Caffir Melon. That waterless area is in some parts habitable for men and oxen only, owing to the presence of the sweet Dachammas." The Caffir Water Melon requiring no cultivation, might advantageously be naturalised in waterless, desert regions, as for instance, along the Southern Algerian *wadis* (our rivers), Egypt, S. California, and West and Central Australia.

Okahandya is doubtless the most promising place for horticulture in the central part of our colony. Broad meadows, consisting exclusively of Cynodon dactylon grass, edge the Okahandya river, interspersed with welcome groups of Acacia hebeclada, and sometimes of Acacia spirocarpodes; 1 50 to 2m. below the thick, grassy carpet, the water percolates in quantities, and is of the purest quality. The alluvial soil below the grass (to extirpate which is a rather expensive work, the long stolons being as tough as wire) is a highly fertile clayey sand

The cultivation of Tobacco is increasing in a very satisfactory manner. For sowing Tobacco, clay pots 4 to 5 inches in diameter are now used; formerly the seed was sown broadcast in beds, and the seedlings were planted out without balls of earth, so that they flagged for three weeks, in spite of small huts covering them against the burning sun; they are now planted in any weather, when of the proper size, and with a large ball of earth. Planted in this condition, and at once watered they do not flag for a single hour. but continue to grow uninterruptedly.

Although pots obtained from Germany are rather expensive here, this method of raising Tobacco is unquestionably to be preferred to all other ways. Every plant, once in the plantation, grows, and there are no dead plants to be replaced; the expensive building of huts made of grass, dry dung, &c., over each transplanted seedling is obviated, and the planting from pots can be effected even by careless natives. This planting out from pots may be strongly recommended to Coffee-planters for these reasons as well as to foresters for any kind of evergreen tree even in the driest tropical places, where the seeds are not sown directly in their final position; thus one transplanting is avoided. For this purpose, pots of firm cardboard, which Schmidt & Co., Elberfeld, have introduced, may be used with great advantage. They are to be had in several sizes, and very cheaply and they do not break as do clay pots: the carriage also is inexpensive (2,000 pots of 7 centimetres, price per mile 18 marks, make only nine post-parcels of 5 kilograms each). These pots last until the trees reared in them are large enough to be planted out. It is true a clay pot lasts for three or four years on an average when carefully handled, but the price for 5,000 such pots of 7 centimetres, costing at Erfurt about 75 marks, is here, in the interior, about 400 marks. To return to my account of the Tobacco: the fermenting is now done here in a proper manner, the leaves are first partly dried, then sprinkled with water, and then fermented: or they are fermented green as they come from the plantation.

The latest plan, which is carried out by one firm is, that the quite fresh leaves are cut with the tobacco-cutting machine, and put into large heaps. Such heaps get warm very quickly, and they are then turned over inside out in a few minutes, whilst the same quantity of leaves would require the labour of one man for half a day. The product is very uniform as regards colour, which is almost black. All the Tobacco cultivated in the country is for local consumption as good cigar tobaccos cannot apparently be cultivated here, the weed being too rich in nicotine. At this moment only American varieties are cultivated, very seldom N. rustica. Although in Okahandya in winter as much as 4° C. and even more is often experienced, the place being over, 1,000 metres above the sea level, and on the borders of a river from 600 to 800 metres broad, nightly radiating, unhindered, the sunshine absorbed in the daytime.

Banana cultivation is found possible and steadily increasing; and it is not that of the wild small kinds like M. Cavendishi, but one of the medium-sized forms, which are so extensively cultivated in the Canaries. I am convinced, that under proper cultivation Bananas would yield remunerative crops at Okahandya and in many other places situated north of this village, not for export, but for home consumption. There are, even at Windhoek, several gardens where

* *Often 30 to 40.*—(Ed.)

the same Banana flourishes splendidly and ripens fruit. Windhoek, is situated 1,660 metres above the sea. Near Okahandya there is a tannery where tanning material, the pounded rhizomes of Hydnora africana ? are exclusively used with the most satisfactory result. The Hydnora grows there in quantities already diminishing on the roots of Acacia horrida. In Gibeon Namaland, there is another tannery, where Elephan orrhisa Burchelli only is used.

I have not found in the *Gardeners' Chronicle* any articles about forestry in the inner parts of Cape Colony, the Transvaal and Orange River Colony. Can you not induce some experienced forester there to write a series of articles about forestry in those parts especially about Eucalyptus planting. It would be indispensable to state the average rainfall, temperature, &c. Thus the statements would serve as a guide for foresters in regions with similar climates. Is there any book on this subject ?—DINTER.—*Gardeners' Chronicle.*

PLANTING RUBBER SEED.

To the Editor of THE INDIA-RUBBER JOURNAL.

In my last article I promised a letter explaining our method of "Planting Rubber-seed at Stake." For the best results the ground should be well burnt over ; all trees, after felling, should be "well lopped"—*i.e.*, the branches should be cut from the trees so that they all lie flat on the ground, so as to ensure a first-class burn ; everything that will burn should be consumed, and only the largest trunks of trees left. There may be quite a number of cedar as well as mahogany trees, and other hard woods of value. The fire does these very little harm, and they may be sawed up later with a whip-saw, or if the owner can afford it a small saw-mill, either for sale or for building purposes, on the plantation.

After the burning is over staking and lining is done, and stakes put in at whatever distance may be decided upon ; but here let me give a word of caution. Put in hard wood stakes that will not rot for at least two years. These stakes serve to show the weeders where the little plants are, and so save them from being cut down with the weeds for at least the first and second weeding. Should the seed not germinate, there is the mark to show just where the supply should be put.

I put two or more seeds at each stake, always in front and rear—as the lines run. Never allow them to be put on the sides of the stake, as this would make a very crooked line but you can see that by planting seed in front and rear—while the plants will be a few inches nearer or further—they will be in a straight line. I open the soil the width of the hoe and about 1 in. deep, two men can do this work to the best advantage, one in front opening the holes, the other closing after dropping the seed and covering them with the soil dug out by his partner, knocking the same back with his foot. In this way they can plant about two acres a day.

Some years this mode of planting rubber does well ; at other seasons it is a complete failure. Last year with us it was a complete success. Thousands of our trees planted on July 4th 1901, measured 4 in. to 8 in. in circumference on October 15th this year, while a few measured 12 in We have planted corn with our stake-planted rubber this season, and have a very fine crop I should say about forty bushels to the acre.

Our rubber this year has been planted 9ft. by 9ft., with two rows of corn between. No doubt it will be interesting to your readers to learn how the Indians plant corn: They take a long stake say about 6 ft., point it at one end, then stick it into the ground about 4 in., throw in three to four grains of corn into each hole, and the corn is planted. No earth is thrown in. Ours was planted in this manner, with the result that we get about 40 bushels to the acre. No weeding is done after the corn is sown till it is saved. When I first saw corn planted in this manner I said, "What fools these mortals be !"

We have a gentleman with us now who saw one my letters in the India-rubber Journal when he was twenty-five days' journey up the Amazon River. While they have more rubber trees there, he says they are fast dying out from greed in tapping ; but for cultivating rubber, he considers the isthmus of Tehuantepec far superior to the Upper Amazon country.

I have received quite a large number of letters since writing these notes in the Journal about lands in Mexico for rubber and other tropical crops. To one and all I would say, "Come and see for yourself." There are new railroads being opened up from Vera Cruz, South, down into the very heart of the Tropics, and land will be going up in price. I have none for sale ; I am simply a planter. If intending purchasers cannot come themselves, get some of your country-men to do the inspecting for you. Good land near railroads can be had just now in 1,000 acre lots at 21s. to 25s. per acre, and much cheaper as you got away from transportation facilities ; but remember, the purchase price is paid but once, while transportation charges have to be paid as long as the property is productive. I think we have solved the question of the expenses in coffee cultivation on this plantation ; after this no more land will be cleared for coffee ; all land will be planted for rubber, and two years after, coffee will be planted under the rubber ; then while you are cultivating rubber, why, the coffee is cleaned for nothing, and, if coffee will not pay in this way the sooner we know it the better for all concerned. I see in some East Indian papers that coffee planters there are going to cultivate their coffee after the Brazil method. They are to send a delegation out there to look into the Brazil *modus operandi* in cultivation, to find out how they make coffee pay when it sells the lowest of any, and pay just ten times more for labour than the East India planter. I would advise them to try rubber where they are not too high up, but I feel certain rubber will not pay at high altitudes.

Where rubber is planted by itself, after three years it can be turned into a cattle pasture, and cattle-rearing pays well here in South Mexico ; hundreds are shipped to Cuba every month but no doubt, sugar-planting is one of the best paying industries on the isthmus. Mexico consumes more sugar than is made in the Republic and a very large import duty is imposed on all imports that come in competition with any, agricultural product that can be produced in the country.

I would like to see other tropical economical plants introduced such as nutmegs, cloves, cola, as all these could be cultivated with the rubber plant and, after the cost of planting is met the cultivating part—which is of course the heaviest—would be done as the rubber is cleaned. I trust to be able to call on the Editor after the middle of December.

JAMES MAUNDER.

[*Editorial Note.*—Since writing this letter Mr. Maunder has paid *The India-Rubber Journal* a visit, bringing with him some extremely fine specimens. Particularly of interest were two samples of corn grown among the rubber which we have seldom seen anything to beat. By the time this has appeared in type Mr. Maunder will have left these shores. He is extremely well informed on rubber cultivation, takes a very great interest in everything concerning it and is enthusiastic concerning the certainty of the future success of rubber plantation.]—*India-rubber Journal,* Dec. 22.

THE TOBACCO AND PALM INDUSTRIES OF SOUTH CHINA.

There are few objects more attractive to the eye than tobacco fields and palm groves in full bloom. They flourish very luxuriantly in the rich soil of which the delta of the Canton River is composed. No doubt, the vast corn-fields of Canada and the extensive fruit orchards of California are more magnificent, but the deep dark green of tobacco and palm fields are full of beauty.

Tobacco has been cultivated in the district around the San Ui city for many decades. It is stated that during recent years, however, the average under cultivation has considerably increased. The assigned reason is that the farmer can command a larger financial return than from any other crop, and, as Tonquin rice is now imported, he can venture to depart from the time-honoured custom of growing, on his little plot, sufficient rice to support his own family. The young tobacco shoot is transplanted from its seed-bed in January, and rapidly springs into a strong plant provided the soil is suitable and the manure liberal. It is planted on ridges, and, in the ditches between these, water flows plentifully. In April or May the lower leaves, being dark and juicy, are carefully plucked, for the Chinese gather them as they gather their mulberry leaves, as they mature, whilst the immatured leaves are left to ripen. About three thousand plants are planted in a plot equivalent to an English acre. When the leaves are picked the imperfect ones are discarded—theoretically—and the drying process begins. A piece of bamboo wicker-work, about six feet by five, is laid upon the ground, and covered with leaves carefully flattened out. Another layer of bamboo is placed upon them, and the two are fastened together. By this simple method, the leaves cannot curl up, and they can easily be moved from place to place. After a week's exposure to the hot sun, the leaves are quite dry, and ready for export. Those who have charge of the drying have a very responsible task, for as we know, at this season rain often falls, and very little water will spoil the leaves. When they have been dried, they are packed in bales of 30 lb. weight, and shipped to Canton and Hongkong. It is reported that a large quantity is sent to Yunnan. Some, too is exported to foreign countries.

One Chinese acre will produce about 830 worth of leaf. Tobacco demands a rich soil and plenty of manure, and even then is not satisfied, for it leaves the soil poorer than it found it, and consequently the farmer cannot cultivate it in the same plot two successive seasons without courting failure.

What the leaf would be if prepared for Europeans, according to Western methods, is perhaps difficult to say, for though a little of it is now made into cheap cigars in Canton, for native use, the bulk of it is prepared to suit the Chinese taste, and is so steeped and saturated with native oils that no foreigner, however seasoned by Manilas, can attempt to smoke it, and few can endure the smell of the smoke without an internal revolt.

One has often wondered why some enterprising capitalist has not attempted a cigar factory in Hongkong. One would think that, good tobacco being available over the way, such an industry would have been tempting and remunerative.

When we stand and admire the palms that decorate the verandahs and gardens of our Hongkong houses, we do not perhaps consider the important part these plants play in the economic life of the Chinese. Nor can we adequately imagine the fine natural scene that a plantation of these palms present. They grow so thickly that the tufted tops meet each other, and when the wind passeth over them there is, between earth and heaven, a glorious undulation of 'living green.' A Chinese acre, one-third of its English equivalent, will support about four hundred of these plants. If the reader can imagine twelve hundred of these growing in an English acre, each encircled with a beautiful green crown, his picture is correct. These palm plantations are, like the tobacco gardens, planted in the very richest and deepest alluvial soil of these deposits, for it is found that in the long run this pays best. The young plant begins to bear marketable leaves about five years after planting, and will continue to do so under favourable conditions, for thirty or forty years. As a matter of fact, however, these plantations never fail, for young plants are set among the older ones long before age renders these latter useless, and when these fall, they lie and die and so form nourishment for the young life surrounding them. The leaves of a healthy tree in the full vigour of life may be cut three times a year, but the rule is two harvests, and yearly growth about twenty leaves. The labour involved in preparing these leaves for their respective uses is very considerable, and thousands of hands are employed at the industry. The labour of cutting these leaves and bringing them into the city is not very difficult, for canals make transit easy. They are then dried in the sun, and afterwards stacked as corn is stacked at home, and will then retain their freshness for years.

A large number of these leaves are manufactured into fans. First their ragged frings are clipped off, then they are passed over a flaming fire in order that the crooked ones may be straightened; after this, they are passed into the homes of the people, where women and girls hem their edges, and so they make a cheap and effective fan, the stem, of course, being the handle.

The trade in these palm-leaf fans is very great, and Chinese merchants are constantly shipping large quantities of them to their *confreres* abroad, especially to those who have made their home in the Straits Settlements. And, verily, they are a great boon to the poor, for the coolie—even though he be an opium smoker—is not too poor to obtain one, and not forgetful of the comfort he gets from one. They are strong; they are cheap; they are as effective as the most costly in the hands of the rich. There are many other uses to which these leaves are put, and the Chinese could almost as well spare their bamboo, as their palm, but enough has been said to give a general outline of this industry.—*Overland China Mail.*

CEYLON TEA IN AMERICA.

IMPORTANT ALLEGATION REGARDING RE-COLOURED CEYLON TEAS.

(By T. Gossupp, of New York.)

It may be of interest to many of the planters of India and Ceylon to know a certain amount of actual facts about the American tea trade without being puzzled by a lot of figures.

In the first place, Ceylon teas are coming rapidly into favour here, and without doubt Ceylon green teas are slowly replacing Japan teas. Unfortunately, however, the Ceylon green teas are offering at rather higher prices than the buyers of sun-dried Japan are accustomed to pay, except for Japan sun-dried teas of really fine liquors.

Your writers may not be aware that there are three classes of Japan teas sold here, the "sun-dried" being similar to our uncoloured Ceylon greens but of much better make, having a darker colour and of rather more delicate flavour in the cup. Then there is the 'pan-fired" Japan which is similar to a coloured Ceylon green, but the basket-fired Japan, to my mind as a tea expert, is far superior to anything I have seen with the exception of perhaps one invoice of Ceylon greens which came, I believe, from Bloomfield estate, but which was only a very small parcel.

I advocated some time ago that the Ceylon planters, in order to cope with the over-production of tea (from which they have been suffering) should endeavour to make an "Oolong" tea similar in flavour and style to the Formosa Oolongs which are in general use here. It would be very easy for any of your planters to write to Formosa or to Japan and get samples from these two countries in order that they may see from an actual sample the kind of tea which is wanted in America. The price of Oolongs to-day is 10d. per lb. c-i-f. N. Y.

To take the United States first, it is necessary to remember that it is about 73 times as large as Great Britain and has a population of 76,000,000 people as against Great Britain's 40,000 000 so that you see if we can once induce the Americans to become tea

drinkers on the same scale as the British people generally, or even, say, they take three lb. of tea per head, in a very few years to come we shall have no fear of over production, as America alone will be able to take nearly all the output of Indian and Ceylon It is therefore, a field we have to consider and during the last few months (when Japan teas have been very high), we had a chance of getting Ceylon green teas into favour, but the price held out for by the planter or merchant in Colombo, has prevented them from being more readily taken.

The grades wanted here are Hyson No. 1 and Hyson No. 2, and for these people are willing to pay from 6½d. to 7d. for the Hyson No. 1 and about 5½d to 6d. for the Hyson No. 2. The Young Hyson grade is generally coloured in New York, which can be done for ½d., per lb. and it is then sold as China Green tea.

A great many of the Ceylon greens sold in the States are coloured, repacked and either sold as coloured Japans or as China green teas, being packed in China packages and faced with the usual paper *exactly*, to represent them as China or Japan teas.

With regard to Canada; this country is different as there is a large population who have now become accustomed to Ceylon uncoloured greens, and the loyalty that exists in Canada prompts the consumer to support British tea in preference to Japan tea. Here again the question of price comes in and the only way that Ceylon greens can oust China and Japan is by selling them at reasonable prices, as the grocer will always push the teas that show him the largest profit.

The labour in Ceylon and India is cheaper than in Japan, so one would think that the planters would have a great deal in their favour. The duty of 10 cents per lb., which was a war tax, is to be repealed on the 1st January, 1903. and it is anticipated that a much larger trade will be done.

Some of the favourite grades here are the Norwood, Labukellie, Condegalla, Meeriabedde, Warwick and similar liquoring teas, so this will guide many of the planters (who are in these districts where this class of tea can be made), to get samples and follow them very carefully and closely, as there is a regular demand for the light liquoring, flavory, good quality (so called lemon flavoured) Ceylon teas.

If a few of the estates shipping desirable and suitable teas for the American market were to create a demand here by shipping direct, they would find that in a very short time the venture would pay as the writer has seen tea sold here 2d. and 3d. per lb. above the price that they sold for in the London auction.

There are other matters I could write about in connection with the tea planters of Ceylon and India, the tea cess, the packages that are required for this market, the question of shipment, and several other matters which I will touch upon in my next letter. —Local "Times"

IMPROVING JAFFNA TOBACCO.

Mr. Gibson's idea as to the destination of his cured leaf is to send the samples of necessary weight to the various European markets he has decided upon, but the bulk he considers should be made into cigars. The present country-made cigars are mostly of a very rank nature; and he believes there is an increasing market to be built up amongst the many Ceylon-born lawyers, doctors, clerks, and the moneyed classes in the island, who are beginning to get tired of the black, dirty Jaffna cheroot so long in use. They would, he thinks, purchase cigars of better-cured tobacco at an increased price. As to his future intentions, Mr. Gibson is most anxious to go on. His faith in the capacity of the island to turn out good tobacco is unbounded, and he is hopeful that the result of the present experiment will make Europeans who are in this island and many others anxious to give his experiment a much extended trial. Jaffna methods of cultivation in small gardens will not, however, satisfy his requirements, and the system of watering the tobacco carried out by each small cultivator would never suit a large property. His idea is that some of the excellent land lying near the Karachi tank could be very successfully utilised. Since he has been in Jaffna Mr. Gibson has not been passive in the matter of the grant of land. which Government led him to believe may be given to him. He has applied more than once to Government to get the matter on a more assured basis: but the absence of H. E. Sir West Ridgeway from the island has, doubtless, been the cause of his making no progress. We trust everything he has been led to expect in this connection will be accorded to him, for the opportunity to test such an important new product as tobacco is one which may not occur again for a long time, should Mr. Gibson be illiberally treated. It was suggested to him in one of these communications that he should wait until the experiment was a success before a definite answer could be expected; but we submit that this is scarcely the way to look at Mr. Gibson's effort, for experiments are not always successful at the first start, and it must be remembered that Mr. Gibson is working in, to him, an entirely new country. We understand that the Ceylon leaf according to Mr. Gibson's idea, will not clash, for instance, with Sumatra grown tobacco which is so excellent for covers in the great markets. The jat of tobacco which is produced in Jaffna is more useful for filling than for being used as outside covers for cigars. It is a tobacco with a flavour and that is the desideratum. As a pipe tobacco the Jaffna leaf will it is also believed, be well received.—Local "Times."

COFFEE CULTURE IN QUEENSLAND

(*From Report Mr. Newport the Instructor*).

Sir,—I have the honour to submit my report 1900 1901:—The past year has, on the whole, being a fairly good one for coffee. The crops throughout the colony have been fairly good, in several localities averaging well over 10 cwt. to the acre. A somewhat curious though not very serious effect of the long dry season was noticed this year in the parchment skin, or putamen, being thinner than is usual The crops in this past season have, in direct consequence of pruning and cultivation, ripened up much more uniformly. Labour for picking has been, on the larger estates, somewhat of a difficulty, except to a few exceptionaly situated ones. In the North where aborginal labour was available, use was made of it, but picking by contract by white men, women, and children, has been much more general. Rates for picking have varied from 2 to 3 lb. of cherry, 1d.; and wages of 30s. and over per week with rations have been made. New machinery, both for drying and pulping, has been erected and put in use this year, for the first time by a number of growers in all distrsets; others have replaced, by good machine, their rough-and-ready or home-made apparatus. Stores and drying sheds have also been built and more use made generally of time and labour saving appliances, the building of a very mill, replete with modern machinery, by Messrs. De Molyns and Butter, of the Lower Russell being a noticeable instance. Crops have in most instances been locally bought up this year, and a few growers, not having pulping machines of their own, disposed of their crop to their neighbours, who have generally purchased it outright at rates varying from 1d. to 1½d. per lb. in the cherry. No coffee this year has been sent to the London market, due mainly to the fact

that fairly good prices have been obtained in Queensland for the higher grades, and of the medium qualities there has not been sufficient to ship a consignment large enough to make its export to so distant a market worth while.—*Annual Report of the Department of Agriculture.*

PLANTING NOTES.

A CANADIAN NOTE.—A good project is now afoot for extending Railway communication from Ontario to the Pacific coast of British Columbia. The length to the projected railway is 3,000 miles, and trade with the Far East will thus be greatly facilitated and encouraged. Canada has vast stores of horticultural and agricultural produce to dispose of, as well as valuable minerals, and it says much for the pluck and determination of our Canadian brethren, that to look at it one way—they have designed a "fall" with the combines of the United States with such admirable "play."—*Gardeners' Chronicle*

GUAVAS.—In the *Report of the Agricultural Experiment Station of the University of California.* part i., published in 1902, we find an article by Mr. J. Burtt Davy on the cultivated Guavas, and their botanical differences. Our colonial brethren will do well to consult this article. The cultivated species referred to are: 1 Psidium guajava, with three varieties, sapidissimum, pyriferum, and pomiferum; 2 P. polycarpon; 3, P. araca; 4 P. guianense; 5, P. Cattleyanum, the Strawberry-Guava, with a variety lucidum. Other less known species are mentioned by name. The distinguishing characteristics lie in the four angled, two angled, or cylindrical stems, as well as in the form and colour of the fruit.—*Ibid.*

UTILISATION OF HOME PRODUCTS.—Dr. Morris, who is exerting his energies so laudably in the promotion of applied botany in the West Indies, points out in the *Agricultural News* (Barbados) that in the days when sugar-growing was very profitable, everything was sacrificed to make way for the planting of Sugar-canes. Then sugar sold for £20, or even £30 a ton; now it is only worth as many dollars; nevertheless, enormous amounts of food-stuffs and other articles are imported, a great part of which could and should be produced locally. The high value of molasses as a feeding-stuff for horses is pointed out, and yet molasses are sold at very low rates in the Islands whilst thousands of bushels of high-priced Oats and corns are annually imported from the United States.—*Ibid.*

FRENCH COLONIAL SCHOOLS.—It is a pleasant duty to have to record the appointment of another Kewite to a post of importance. In this instance the fortunate individual is Mr. H. Navel, who after having been educated at the National School of Horticulture at Versailles, and having stayed at Whiteley's nurseries long enough to learn the English language, made a stay of twelve months at the Royal Gardens, Kew. He then returned to Franco, and after spending some months in tho "Jardin Colonial" of Vincennes, under the direction of M. J. Dybowski, has recently been appointed *Directeur des Cultures de l' Institut Colonial de Nantes*, a post lately created by the French Government for the development of the instruction and also for the rearing of economic plants useful to intending planters in the French colonies. Our best wishes to the new director who, during part of his stay in England, occupied the position of Vice-President of that useful institution the Société Francaise d'Horticulture de Londres, which has done so much during tho last twelve years on behalf of the young French gardeners who have resided in this country, and the few English gardeners who have sought its help and support to procure for them suitable situations on the continent. It is a society to which every English gardener, having even a small knowledge of French, might well belong.—*Ibid.*

FOOD OF PLANTS.—M Laurent in a recent number of the *Comptes Rendus* shows that glucose, saccharose, and other sugars, as well as glycerine supply excellent food for plants. and that humic acid in the form of humate of potassium modifies those interchanges of gases which lead to the assimilation of carbon in the plants. On reading this, one wonders whether refuse sugar-canes, from which all the sugar cannot bo extracted, would be serviceable as manures. —*Ibid.*

THE RUBBER INDUSTRY.—In Ceylon, and in the Straits Settlements, large plantations of Para rubber (Hevea brasiliensis) have been made by private enterprise. The Government of India now propose to plant 10,000 acres in Burmah with the same tree, a proceeding viewed with dismay by the private growers in the colonies aforesaid. The Secretary for the Colonies has been memorialised on the subject, but the demand for rubber is so great that it is hardly likely that steps will be taken to limit the output in any way.—*Ibid.*

KEEPING BIRDS OUT OF FRUIT TREES.—The birds of Ceylon must have different ideas of the value of material objects from those entertained by our Queensland felons in feathers, the fruit-eaters. In our February issue we described a plan for obstructing their nefarious proceedings by means of looking glasses, as given by the *Ceylon Tropical Agriculturist* A correspondent from Georgetown, Etheridge, not, writes to say that be has found locking glasses to be a complete failure. The bower birds simply danced round them with delight, and one even tried to carry off a bit of the broken glass. Our informant bought a dozen of cracked mirrors and hung them by strings from sticks stuck in the ground and on the branches. It appeared, however, that the birds were rather attracted than repelled by the glitter of the mirrors. Those who know the habits of the bower bird will not be surprised at that dancing dervish amongst birds trying to run away with the glass for they seize on anything shining, as well as shells, to scatter round their bowers, which are often 'halls of dazzling light."—*Queensland Agricultural Journal.*

EDUCATION IN THE NETHERLANDS.—There has just been issued, through the King's printers (Eyre & Spottiswoode, West Harding St., E. C., price 5), what may be termed a supplementary report on the system of education established in the Netherlands, the result of enquiries by a commissioner sent over for the purpose of gathering up facts, possibly for use by the House of Commons in its struggles over the Education Bill, now on the legislative "stocks," and where it is likely to remain some time longer ere being launched into history as a full fledged Act of Parliment. We can only hope that our legislators may find the little book of use to them, as it surely will be of interest, seeing that we are being assured that we are ever so much behind every body else in the matter of education. Our Dutch friends are very earnest educators, and those who are being educated must also be very earnest in the subjects to pass in which is necessary to matriculation. Amongst other things being three languages (modern) mathematics chemistry, theoretical and practical mechanics, and goodness knows how many more. In all "centres" these are subjects common to all; in some, selections are made: agriculture is well cared for; and botany, it may be said, of course, runs side by side; and botany, it may be said, of course, runs side by side; or is forestry forgotten. We are under the impression that the sons of farmers do not sufficiently estimate the advantages of the education provided for them by State and Commune. Evening classes are felt to be a boon by very many, and compulsory attendance at day school has resulted in nearly all juniors finding their way to the class-room. The little book is well worth persual by all who take an interest in the proper education of the rising generation.—*Gardeners' Chronicle.*

TEA PROSPECTS.

With reference to recent articles in the periodical "Tea"—the latest of which we reproduced on page 497,—a Ceylon proprietor writes from London, Dec. 11th :—

"There is not the slightest doubt but that we shall never be permanently right until we can have some organisation among the sellers, as well as among the buyers."

We attract attention to the contribution by "Suum Cuique" given elsewhere. He makes the bold statement as regards "overproduction" that it has never exceeded 5 per cent of the requirements of the market and that the trouble and low prices are due to the combined action of large buyers and the want of cohesion among producers. All that he writes on the subject should theretore be carefully studied by planters.

EXPORTS OF CEYLON TEA TO THE UNITED KINGDOM IN 1902.

The following are the monthly shipments of Ceylon tea to the United Kingdom during the past year, in round numbers :—

			lb.
January	..	..	9,250,000
February	..	..	8,000,000
March	...	...	8,500,000
April	..	..	9,000,000
May	...	..	9,750 000
June	...	..	13,000,000
July	..	..	10,750,000
August	...	...	7,250,000
September	...	..	6,750,000
October	...	...	7,000,000
November	..	..	6,250,000
December	...	...	9,000,000
	Total	...	104,500,000

Estimate for January 1903—9½ to 10 millions lb.]

SUGAR AND RUBBER IN THE STRAITS.

We were sorry to miss Mr. John Turner, the General Manager of the largest Sugar Cultivation Company in the Straits : he arrived by the ss. "Arcadia" recently and left in a few hours by the ss. "Coromandel" for Penang. Referring to Sugar prospects, Mr. Turner writes to us :—

"You will no doubt have seen what has been taking place in connection with sugar bounties. Prices have already gone up considerably and we look for a further rise. So that with our new estates we are in a position to take full advantage of the rise."

Mr. Turner is also interested in rubber.

SWEET POTATO FROM BARBADOES.

(From a home Correspondent.)

Messrs W Pink and Sons, the well-known wholesale fruit merchants, have begun a new departure to which Mr Alleyne, M L C, Barbadoes, has been drawing attention in the newspapers. They are now regularly importing

into this country from Barbadoes and hope to develop a good market ere long. They have, at present, only stocks of sweet potatoes, Mr Pink tells me, but after Christmas he expects large deliveries of yams. The sweet potatoes they sell in baskets of about 17 lb and 34 lb and barrels of 124 lb, prices being respectively 3s 6d, 6s 6d, and 16s, carriage paid to nearest Railway station. The endeavour to introduce those vegetables is further assisted by recipes stating how to cook Barbadoes' potatoes, taken from a pamphlet issued by Ceylon's old friend, Dr Morris, C M G, Commissioner of Agriculture for the West Indies. I append a few of those at the end of this letter for the benefit of any Ceylon housekeeper who may sigh for something new for dinner. Housekeepers here, who have more variety to select from, are yet showing interest in the new vegetables from the West Indies, and the idea seems worthy of support in view of the distress of West Indian Industries at the moment. It is said yams and sweet potatoes are very deliciously cooked in this country where really good butter can be incorporated with them in various ways. That may be, but some of the recipes Dr Morris brings forth out of his treasury of knowledge smell of indigestion to the experienced stomach to which the yam is not entirely a new creation, notably the rich pastry dish, which prudent "lovers of the table" (vide Cockle's pills) will put off trying till the New Year festivities are safely past !

RECIPES FOR BARBADOES POTATOES.

(Broiled.)

Potatoes to be half-boiled, the skin removed, and put in the oven till brown. Cut into pieces, serve hot.

(Rechauffé of Cold Barbadoes Potatoes.)

Mash till perfectly free from bumps, stir into every pound of potatoes two table-spoonfuls of flour, two of minced onion and 1 oz. butter ; add sufficient milk to moisten well, press in a mould, bake in a moderate oven till brown and turn out.

(Barbadoes Pie.)

One quart of Barbadoes potatoes boiled and mashed, three beaten eggs, three table-spoonfuls of sugar one table-spoonful of butter, half a nutmeg (grated), half tea-spoonful ground cinnamon, a little ground cloves, a little lemon peel, enough cream to mix together to a batter. Line the pudding dish with a rich pastry, pour in the mixture, and bake with a top crust.

PRODUCE AND PLANTING.

We published last week a vigorous appeal from a correspondent calling upon

TEA PRODUCERS TO COMBINE.

Our correspondent, after putting forward proposals for meeting the present difficulties of tea-growers, asked who will move in this matter? Some days have elapsed since our correspondent's letter appeared, and up to now there is, so far as London is concerned, but small indication of any movement on the part of those chiefly interested. We have received some letters, but so far the attempt on the part of our correspondent to inspire the leaders of the tea industry with life and action, even to the extent of calling a meeting to discuss preliminaries, has met with no overwhelming response. Possibly some step indicating concerted action may be contemplated, but if this be so, nothing has leaked out in confirmation. We trust that those who desire to initiate some movement

for the general welfare of the tea industry will not be left to the empty echo of their appeals. It may be premature yet to write that nothing is likely to result. Those who are prepared to act must wait a little longer before finally deciding that their efforts are in vain, but it would have been encouraging at least if some enthusiasm could be traced in favour of a live movement towards unanimity and a practical plan of campaign. The operation of crying in the wilderness is disheartening, and is calculated to lead to the conclusion, which we trust is not yet completely justified, that any attempt to bind the interests of tea growers which may conflict in minor matters but should be identical in the main, is doomed to failure.

While the British-grown tea industry is under a cloud because of over-production and other causes, reports are received of a threatened extension of tea growing in lands when the experiment will be new. Texas will make an attempt, and we hear also that M Prudhomme, Director of Agriculture in

MADAGASCAR

believes that tea can be cultivated in almost the whole of the island, but especially on the East Coast, which is moist and rainy. There may be some slips between the cup and the attempt to fill it with tea from Texas and Madagascar, but it shows the keen desire exhibited on all sides to cultivate tea where climatic conditions render it possible.

With reference to the

PROPOSED TEA CULTIVATION IN TEXAS

the "San Antonio Express" says:—J H Kinsler, representative of the Department of Agriculture, who has been investigating the adaptability of the soil of Eastern Texas to the cultivation of tea, has returned to Washington. The Department of Agriculture will put in an experimental farm for tea. Just where the experiments will be conducted is not known. The citizens of Nacogdoches have formed a stock company recently for the purpose of furnishing to the Government the land and help and building necessary to experiment with the growing and curing tobacco. Something was said at that meeting about tea, but no action was taken. Wherever the Government believes the tea farm should be placed, there is little doubt that the citizens will get together the necessary funds to provide the lands.

THE JAPAN TEA COMPANIES

are reported to be forming a combine consisting of the following firms, viz: The Kyusu Tea Export Co., the Nagasaki Brick Tea Manufacturing Company, the Fukuoka Tea Manufacturing Company, of Fukuoka, and the Higo Tea Manufacturing Company, of Kumatoto. The aim of the combined companies is to extend the business of tea export into Siberia. The agreement that has been entered into sets forth that the three last named companies shall procure their tea from Kyushu Tea Export Company, which will undertake the actual business of exporting for the combination.

INDIAN TEA IN CENTRAL ASIA.

In his new book, "Across Coveted Land," just published by Macmillan, Mr A H Savage Landor, referring to Seistan, the half-way house between Quetta, in British India, and Meshed, in Persia, says that a greatly developed Indian tea trade will, in all probability, pass through it some day. Mr Landor, in his interesting chapter on this subject, believes that only an understanding with Russia is needed to procure for Indian teas a most profitable market, not merely in central and Western Asia, but all over Europe.

TEA IN CANADA.

Whatever sceptical persons may have thought a short time ago, it is evident that British-grown green tea have secured a permanent footing upon the market, says the "Canadian Grocer." Of course, their use is very small when the quantities of China and Japan greens that are annually consumed are taken into account, but the fact that their consumption is steadily increasing, and that they are now figuring in the statistics which are from time to time issued in regard to tea is evidence of this. A return recently issued, giving the distribution of green tea from January 1st to the end of September, shows that there has been a substantial increase over the same period last year. The quantity exported to all countries was 637,224 lb, while this year for the same period the quantity was 1,593,063 lb. In 1901, Russia took no Ceylon green tea, but this year she took 106,435 lb. Africa also appeared for the first time as a consumer of Ceylon greens. Australia and China on the other hand, while they took small quantities last year did not take any this year during the period in question. Our readers are, no doubt, mostly interested in the figures relating to the quantities exported to this continent. These show that, while for the nine months last year the quantity was 457,982 lb this year for the same period it was 993,970 lb, an increase of about 117 per cent. Our own trade returns giving the imports of green tea into Canada show that for the fiscal year ending June 30, 1901, we took 81,574 lb of Indian and 335,815 lb of Ceylon green. This year, however, the figures were 71,466 lb of Indian green and 520,480 lb of Ceylon green tea. The dearness and scarcity of China and Japan green teas have, no doubt, materially added to the consumption of British grown green teas on this continent, but, of course, to what extent cannot be estimated. Whatever may be the causes, the fact remains that the consumption is increasing, and not only in America, but elsewhere.—*H. and C. Mail*, Dec. 12.

AN AERIAL ROPEWAY IN SOUTHERN INDIA.

BY L. DAVIDSON.

The native State of Travancore pays an annual tribute to Britain of £80,000, and has a population of about 2,500,000. It occupies a strip of land of 6,730 square miles on the extreme south-west of India, and Cape Comorin is situated at its southern extremity. From the sea coast, which forms the western limit of this native state, the land rises eastward to the summit of the range of hills which, running almost parallel to the coast, separate Travancore from British Territory. On the eastern, or British, side these hills are too steep for railway—and in many places for road—construction, but on them are large areas of rich land, which are to some extent cultivated with very profitable results. The greatest difficulty attending their development lies in easy and cheap means of communication, for the transport of labour and food to the estates, and of the produce to the lower land, where it finds a market.

An example of how this difficulty has been overcome on one large estate is of considerable interest. It is located at a point where the rise from the plains to the cliffs at the top of the "ghaut," is unusually steep and rugged, in some parts there being an almost perpendicular face of rock from 1,000 feet to 1,500 feet in height; below this are several thousand feet of steep, rugged grass land, sparsely dotted with trees and broken up with innumerable ravines. The crest of this ridge is 6,000 feet or more in elevation, and the plains at the foot are about 1,200 feet above sea level, so that there is the extraordinary rise of nearly 5,000 feet in an average horizontal distance of about five or six miles. The eastern side is British territory, and very dry, much cultivation being done with the aid of wells, though the recent completion of the Periya-aar irrigation works, which comprise a dam in one of the valleys on the Travancore side of the range, with a "bund" 150 feet deep, and a tunnel through the hills to the dry British side of the country, enables a large tract of land to be irrigated which

would otherwise be subject to the vicissitudes of irregular rainfall, and it is hoped, from this source alone, that 100,000 acres of rice land will be kept under permanent cultivation.

The rainfall in Travancore side of the range is very heavy, amounting to 250 inches per annum, and even more in some parts; while it is not over 30 inches on the British side, only a few miles distant. An agricultural company secured a concession from the Travancore Government of some 100,000 acres of land, and has of recent years been developing the suitable portions for the cultivation of tea and coffee, cardamoms and chinchona; about 20,000 acres are now under these varied crops. The labourers required in connection with the gardens, together with their families, number about twenty thousand, and in order to feed them some three thousand transport ponies, donkeys, and cattle were employed, besides a large force of probably not less than eight hundred coolies for carrying head loads.

The principle base of operations, Munaar, was thirty-two miles from the end of the cart road on the plains, which ran from that point to a station on the South Indian Railway; along this road it is hoped that a narrow-gauge railway will be laid by a company which has secured a concession from the Government. The road has been extended recently by the Agricultural Company ten miles of a valley to the base of the steep ghaut, and from the top of the range about forty miles of cart road have been constructed in various directions to serve the estates. It was to connect those two points that it was decided to erect an aerial ropeway capable of filling the company's requirements, as well as those of the general public, for many years to come. A cart road up this ghaut would have been impossible to make or to work except at a prohibitive cost. The question of cutting a cart road in a westerly direction was also duly considered, but the heavy cost of construction through virgin forest in an unhealthy country, with a rainfall of upwards of 250 inches, and the fact that fifty miles of such road would have had to be made and maintained under difficult conditions, resulted in the abandonment of the idea. It was finally decided to join up the steep section between the ends of the two roadways by an aerial rope line, and the type to be adopted received careful consideration. The local engineer of the company, Mr Kemlo, finally designed the installation with a view to erect an efficient ropeway with materials of as light a section as was compatible with strength, as the cost of transporting material in the very unhealthy ghaut was excessively heavy. His design took the form of a moving rope carrying its own loads, and although the trouble in connection with its installation was great, the results have more than fulfilled expectations. This is probably the steepest ropeway of its class in existence, and its success is in a large measure due to the grip carriers which will be described presently. The total length of the ropeway is 2.6 miles, measured along the slope of the ground, and the rise is about 4,000 feet. It is divided into two sections, the lower one being 7,400 feet in horizontal length, with a rise of 2,150 feet; the upper section has a horizontal length of 5,800 feet, and a rise of 1,850 feet. In the lower sections, there are thirteen spans, the longest being 1,028 feet horizontal, and in the upper section there are nine spans, the longest 1,560 feet horizontal. The slope is fairly uniform throughout, except, that the lowest four spans are less steep than the rest of the line.

Fig. 1, Plate XLV, is a profile of the line. The positions of the standards are numbered consecutively from 1 to 18, and the information on the section is so complete as to render any further reference unnecessary.

The reasons for working the rope in two sections are (1) in the event of breakdown only half of the installation would be out of work; (2) that part of the stress at the top, which is due to the weight of the rope, is diminished, and thus its load-carrying capacity is increased; and (3) the climate at the foot of the Ghaut is so unhealthy that no European could stand it, while by the present arrangements the ropeway is worked from the central station, which, being at an elevation of nearly 4,000 feet, is comparatively healthy. The rope is of good quality plough steel, ⅝ inch in diameter, and about 1 lb weight per foot. It was sent out on eight drums with an interchangeable axle and wheels, and each drum was rolled into the line of ropeway and unwound on the axle, the hauling being done by ⅜ inch steel ropes on hand winches, a tedious process. Four drums of rope were required for each section; the splices were 60 feet long, and have stood well. The rope is supported on 18 inches pulleys, with groove of 1 inch radius, and the pulleys are carried on light angle steel standards of various heights to suit the nature and slope of the ground, varying from 10 feet for the lowest to 40 feet for the highest standard. The feet are in most cases embedded in concrete blocks, though in some instances they are bolted on the rocks that happened to be in the line of ropeway. One rock shown in the engraving, Fig. 2, Plate XLVI, was 120 feet high, and an iron ladder was fixed to its almost vertical side to enable the work to be done at all.

The engraving, Fig 3, Plate XLVI, shows the standards very clearly and indeed gives a good idea of the ropeway generally. The other illustrations on this plate are characteristic of the work. Fig. 4 shows one of the terminal stations, and Fig 5 shows the zigzag cart road approach to the upper terminus. The tension gears are at the top and bottom stations (see Figs 6 and 7, Plate XLVII). The tension wheels are 8 ft in diameter, carried on a sliding arrangement 35 ft long. The requisite power is got by a worm wheel winch and three block sheaves with a half inch specially flexible wire; the anchors are heavy masonry and concrete blocks over 30 tons in weight.

The driving arrangements are at the central station, and consist of two electric motors, either of which can be used geared on to a counter-shaft which, in its turn, operates, through a rope drive, a vertical shaft and pinion geared on to two 8 ft spur wheels. These spur wheels have bolted on to them hard wood pulleys, by which the ropes are driven. The upper and lower sections of the ropeway are connected by shunt rails, along which the loads pass one road to another, and at the termini loads automatically run off the rope on to shunt rails, or off the rails on to the rope, without any loss of time.

The current for supplying the electric motors is generated about a mile further down, at a point where a head of 750 ft. of water is available. This operates two Pelton wheels; they in their turn drive two dynamos, each supplying 40 amperes at 500 volts. One of these is sufficient to work the ropeway at two miles an hour, while the other is always ready in case of accidents. No water power was available nearer the central station than at this point, so that electric transmission was indispensable.

The general form of carriers is shown in Fig 8 to 12, Plate XLV. It consists of a frame or hanger, B, which carries the load clear of the standard head pulleys. To the upper end of this frame the rope-gripping arrangement is attached. It is made up of the frame, A, carrying two pendant jaws, E E, which are so arranged that when the load is run along the shunt rail, and the jaws come in contact with the rope, they automatically close on and grip it with a force proportional to the weight of the load. The other letters on this figure refer to the following parts: I is the carrying pulley; F is the shunt rail; and O is the supplementary pulley running on the shunt rail and taking the load off the rope.

Enlarged details of the jaws are given in Fig 9 and 10. In Fig 9 the jaws are shown closed over the rope, a result due to, and varying with, the amount of load suspended. In Fig 10 the jaws are open and the rope released, the weight on it being removed. It will be noticed that the proportions of the jaws do not interfere with the free running over the pulleys.

Fig 11 and 12 show a somewhat modified form of the grip arrangement.

The large groove in the standard head pulleys has the advantage of altogether preventing the rope from being jerked off, which is a common fault with the ordinary rope-carrying pulleys having a groove only half the diameter of the rope.

The top bracket A, of the grip frame shown in Fig 8 carries a rail pulley D, already referred to. This comes in contact with the shunt rail F, when the load reaches the end of its journey, and as the shunt rail is laid at a flatter down grade than the rope at this point the weight of the load is taken up by the rail, and the pendant jaws open and release the rope automatically. This process is reversed at the loading side, the shunt rail being almost level while the rope has an upward slope at this point, so that as the load travels along the shunt rail, the open pendant jaws close on the rope, and the load is automatically taken up by the rope from the shunt rail.

The loads carried are limited to 5 cwt each, but necessarily most of them are less, as it is easier to handle lighter loads though the ropeway is capable of taking far more than the existing traffic.

Assuming forty loads as about the average number on the rope at one time, a delivery is ensured of fifteen loads at both ends per hour, when the rope is running at the rate of two miles an hour, and working ten hours with 4 cwt loads. This gives an average of 30 tons a day each way, or more than double the ropeway has actually to carry. The speeds arranged for are one, two, three, and four miles per hour, but at two miles the line handles more than has been required of it hitherto. The economy in working, as compared with the old methods of transportation, is close on £1 per ton. The advantages of being able to erect an aerial rope of this class on steep grades are obvious, as not only does it effect a considerable saving in regard to the original cost of the installation, but by the use of the grip carrier described, the life of the rope is greatly prolonged, owing to the fact that they probably never grip exactly the same part of the rope twice, and the wear and tear is thus equalised throughout its length.

The prospects of success when the work was commenced were small, but the results obtained have been very satisfactory.—*Traction and Transmission* for Nov. 1902.

A NEW CEYLON PUBLICATION: "SPOLIA ZEYLANICA."

"Spolia Zeylanica" is to be the title of a new publication issued by the Ceylon Government Museum, Colombo, for taking the initiative in which credit is due to the new Director, Dr. A. Willey, F.R.S. The publication will be commenced shortly in the form of an Illustrated Quarterly Journal, containing Records and Contributions, together with Notes, Abstracts and Reviews, relating to the Economic and Systematic Knowledge of the Natural Resources (Zoology, Anthropology, Palæontology) of the Island and of the surrounding Seas. The subscription will be R5 per annum, payable to the Director, Colombo Museum. We wish the new Quarterly all success.

BLENDING INDIAN AND CEYLON TEA;

SAUCE FOR THE GOOSE MUST BE SO FOR THE GANDER.

Lately our evening contemporary contended that it was an advantage to Indian tea planters that Ceylon tea should be admitted free:—

Indian tea is not so palatable as a blend of Indian and Ceylon teas, and that, as a matter of fact, the use of such a blend will be to the advantage of their consumer and to no real disadvantage o Indian producers.

The "Indian Planter's Gazette" is not to be caught after this fashion:—

If it was a fact that the indigenous article was undrinkable by itself, and unsuitable to the palates of consumers without the admixture of an exotic brand such as Ceylon, surely the largest firm of tea dealers, Messrs. Brooke, Bond & Co., Ltd., would have taken cognisance of it, and would not have confined themselves to selling blends of *pure* Indian tea. We have their assurance that the blends they are selling in this country are all blends of *pure* Indian teas. This statement cannot be gainsaid, so where does the contention of our contemporary come in? Some time ago it was suggested that the Ceylon import duty should at least be abolished on Indian tea, so as to permit of blends of Ceylon and Indian teas being made in Colombo. But our Island contemporaries would not hear of it. Now, however, in their attempt to drive in the thin edge of the wedge, they put forward the cool proposition that their product should be blended with ours in order to make it go down the throats of our *hoi polloi* the more easily. Such a procedure, we are told, will make our teas demotic. But, needless to say, we are well able, with the great varieties of tea we produce in this country, to cater to the wants of our proletariat, without the assistance of any adventitious aids. With Ceylon, however, it is otherwise.

Our Calcutta contemporary is inexcusably wrong in part of the above; for he has had evidence before him more than once that the *Ceylon Observer* has consistently advocated the abolition of the Ceylon *import* duty on tea as an antiquated, unjust and altogether indefensible levy,—the proper substitute being expert inspection at our Customs to keep out any teas below a certain standard.

CHINA TEA EXPORTS—it will be seen from the latest reliable figures published elsewhere—are still far ahead of the preceding year. To the end of the year 1902 the increase was 13,725,567 lb. America has taken about 10 million lb. more than on the previous year, Russia has taken some 4 millions less, and England 2 millions less.

"COLOURED" CEYLON GREEN TEA REJECTED IN AMERICA.—We direct attention to the information conveyed to the Ceylon Planters' Association by Mr. William Mackenzie regarding the rejection of 38 packages of green tea in New York. From the statement "some colouring trick had been tried on it" it would appear that Mr. Mackenzie's friend is under the impression that colouring Ceylon Tea is unusual in America. This is not so. After the above disquieting statement we should like to be sure that of the green tea which leaves Ceylon for America none continues to be similarly treated before shipment; though our Commissioner does not actually state the present "trick" took place in Ceylon. We have credible authority for saying that much of the Ceylon tea which leaves here as pure Ceylon green tea is treated in America before being placed on the market. Perhaps the American buyers prefer to do their own colouring, with colouring matter, before the green tea is sold; for then they know exactly what they are offering to the public?

TEA IN 1903:

THE PROSPECT FOR WEATHER AND CROPS;

EXPORTS FOR 1902 AND ESTIMATES FOR 1903.

The year, which has just closed, has not been a red-letter one for the tea planter. Abnormally wet weather has been the main factor in the untoward result, and further emphasis was supplied by a long continuance of low prices. But that season is now behind us; and with past experiences as a guide, our thoughts naturally turn to the opening year with its fresh hopes and probable possibilities, and we ask ourselves what the future months have in store for the premier culture of the island. A great deal depends on the weather, and how uncertain that is, goes without saying. And yet in this age of possible impossibilities, a new prophet, Mr. Hugh Clements, has arisen, with Mr. Wm. Digby, C.I.E., formerly of the *Observer* staff, as his mouth-piece, who claims in the latter gentleman's work on "Natural Law in Terrestial Phenomena," to have found the secret to enable him to forecast the seasons. As Mr. Hugh Clements, however, will likely have all his time employed in defending his theory, and will not be available for the service of the Ceylon planters, we are forced back from the region of exact science to the land of incertitude and the rule of thumb.

Meteorologists tell us that the longer it has rained the chances are that the longer it will rain; and Ceylon has had its wet cycles, but happily also its dry ones. What a prospect we would have before us of soddenness and green mould if the rule mentioned above was inviolable! Happily it is not. Tropical agriculture has found its best interpretation rather in "the swing of the pendulum"; and the poet's saying "all things will come round to those who will but wait," has been vividly illustrated in many a pathetic story of planting life. Last year having been a poor year for tea, we instinctively feel that this year should be better, and, given decent weather, we feel sure it ought to be. Tea is in good heart, is healthy and free from blights, and whatever there may be in the idea that the flood-tide of production is past and increase by "leaps and bounds" only now to be a memory, to expect in 1903 such beggarly months as was November of last year, is, in planting circles, to anticipate the incredible. Planters, in submitting crop estimates, do not, as a rule, add a "D. V." to the tabulated figures; but it is unconsciously done when they postulate a normal season, a rule which the wise ones adopt. If planters could approximately forecast the weather, there would be no necessity for the occurrence of shortage of estimates, nor the apologetic eloquence which Chairmen of Companies indulge in, in explanation thereof. After so much rain, it is quite within the range of possibility, that the present year may prove a dry one. In 1891 the rainfall in Colombo was 119 inches, and 1892 followed with only 60 inches. If this should be duplicated this season, the tea crop might even suffer, and instead of the anticipated increased outturn, there would be receding figures. High estates would gain through an excess of sunshine and a paucity of rain, and the reserved energy, which has so long been kept in check by the cold and wet, might burst out into exuberant flushing, and bring about a busy time. Medium and low places would, however, fall off, and as these properties are in the majority, a serious deficit might easily occur. It used to be held that it did not matter very much to have a period of poor returns, as it was certain to be made up later on; but we are not sure that this idea obtains now to anything like the same extent that it did formerly, nay, the more general experience is that it is a hard task to recover lost ground, and that the tea bush, unless stimulated by manures, has a horizon limited by today, and is pretty much unaffected by what was left undone yesterday, or the day before that.

Another point to be considered in a speculative estimate of the coming season, is the Labour Question, which is too important to be over-looked. Granted a season of pressed down and overflowing measure, could it be effectively harvested by the present labourers at command? For some time back there has been no high pressure from flush, which would have withdrawn all hands from other work, and yet spite of this slackness, our planting reports hint at work so necessary as pruning, being far behind on certain places, and other needs clamouring vainly for attention. The estate, which is well supplied today with coolies, is somewhat exceptional, while the bulk of places—in many districts if not in all—register "short," or "very short," as the condition of the labour force. It is a kind of hand-to-mouth existence which, we fear, is the present condition of labour in many parts of the planting districts and while it may be possible to get along during the slack months in a kind of crippled and worrying way, a real good season—unless a determined effort be generally made to recruit new coolies, and gangs are strongly reinforced—would be no blessing, except, perhaps that disguised kind which, the optimist always discovers, hidden somewhere under the shadows cast by disaster. If the squeeze, at present, were severer, there would be more hope of immediate action to relieve it; but as it can be borne without much inconvenience the industry may drift into the future busy months badly equipped, unless planters wake up, and there may be later on, a real regret, when regret is unavailing.

From the home side there is every reason to expect substantial returns for tea shipped. There are, of course, the large blending Companies who charge solid, and with determination to break down prices: but restricted offerings in the London market, circumvent their selfish plans, and the law of supply and demand comes into free play and reflects itself in the markets' bidding. The home outlook is very hopeful, and the regular trade circulars, which have been for so long a time, dreary

reading, and have had for their key-notes the imperative need for a reduced output and a higher quality of tea, are now becoming quite chirpy in the growing brightness of the dawn of better times. Private advices also, which had acquired a stereotyped style—apologetic in tone for the wretched market and its low rates, with a saving clause that the teas arriving were poor—are today much changed. Planters are said to read them now with real pleasure and every tea-maker swaggers around with an unconcealed air of being master of the craft of manufacture! A leading London agency firm, writing last mail on the prospects in view, said:—"About half the Indian crop remains to be sold between this time and 31st May, and the quantity offered each week will probably average 37,000 packages. This makes a total much less than last season's and as supplies of Ceylon teas are at present not in excess, there is reason for a continuance of good markets." The present year, therefore, has opened both in London and Colombo—to judge by yesterday's sales—with much promise; and, given a fair weather record and an increased influx of Tamil immigrants, its close should be more heavily gilt, than the year which has just expired.

As regards ESTIMATES of the EXPORTS for the current year, there are several, we hear, floating about Fort offices of more or less authority. In our last *Overland* summary, we ventured on the best approximation within our scope at the present time. Against a total of 148,994,730 lb. of all kinds of tea shipped in 1902, we put down 153 millions for 1903; but of this 8 millions are given as green tea—leaving 145 millions (100 to United Kingdom against 103 millions in 1902; and 45 against 43¼ millions to other places) for Exports of Black tea to all countries. It may be said, indeed, that as not much green tea goes to the United Kingdom we put down nearly 52 millions lb. altogether of our teas as likely to be sent to "Other Countries" during the present year. This is surely a liberal enough estimate? A merchant with special interest in tea crops, who has seen our figures and who remarks on the discrepancy between the Chamber's and P.A. figures for "greens" (so much green tea really shipped as "black") writes:—

"Bounty was paid in 1902 on 3,914,062 lb. greens. Shipments of greens have therefore probably been about 3½ millions, against 2,806,844 lb. per Chamber of Commerce. A good many fresh estates are making greens, but the 388,806 lb. for the last half of December may be partly accounted for by a rush of applications before the bounty is reduced to 4 cents. I see Mr. Philip does not give the lbs. on which 5 cents bounty can still be paid, as he usually does? I think your estimate of 153,000,000 lb. a very fair one and reasonably, I don't think crop will be more."

For further details, we can only refer to last *Overland* Summary, meantime emphasizing the fact that if weather prove unfavourable, or labour runs short by April-May, we may not even see 150 millions of exports realised. At the same time the London market cannot complain if we only send them 100 millions lb. of black and perhaps 1½ million lb. of green tea, during 1903.

TEA IN PARIS.

Under the heading "Paris at Five o'clock." Mrs Alec Tweedie described last week in the *Pall Mall Gazette* the craze for tea-drinking in the gay city. In the course of her article Mrs Tweedie said:—"There have been several revolutions in Paris; but none more complete than the

REVOLUTION OF THE TEA CUP.

Tea cost forty francs a pound at the time of the coup d'état, and was only indulged in on rare occasions by the wealthy. Afternoon tea was almost unheard of ten years ago in Paris, and yet today it is the fashion everywhere. There is no doubt about it: afternoon tea is a particularly British institution. Rich and poor alike enjoy that stimulating beverage between four and five o'clock, and look upon it as a necessity of existence. This has been the custom for years, ever since the duty went down and the imports from China went up; but until lately Britain has stood alone as a drinker of afternoon tea. Is the present craze in Paris the outcome of the International Exhibition of 1900? Is it the result of the British invasion at that time, which clamoured for afternoon tea, a habit followed by other weary sightseeing folk, who in their turn found it so refreshing that they have kept to the habit? Or is it that fashionable Parisians dine so much later nowadays, they find refreshment of some sort is necessary between a twelve o'clock déjeuner and an eight o'clock dinner? Whatever the cause, the revolution is complete, and Paris has succumbed. In many of the fashionable hotels a notice is posted in the hall intimating that the band will play from four to six o'clock, when tea will be served. The idea of smart hotels is being quickly followed by smaller shops, and bills announcing in English 'Five o'Clock Tea' may be seen on every side. So completely have Parisians adopted our custom, they speak of the meal as 'le five o'clock,' the word 'tea' being often omitted altogether.

"THE REVOLUTION IN TEA"

has gone even further. We have lately stayed in three delightful old French châteaux, where nothing is more noticeable within the last few years than the decline of coffee and the ascendency of tea. Formerly everyone took 'café au lait' at their early breakfast in their own rooms; now tea is almost as universally drunk as coffee. Formerly everyone drank café noir after déjeûner and dinner; now, apparently, only half of the people do so. Formerly coffee was excellent it was a treat to go to France for the sake of the coffee alone; but this is changed. So many people have given up drinking coffee and those take it black so often drown its flavour with liqueurs, that a cup of really good coffee is now the exception and not the rule. The tea has improved as much as the coffee appears to have deteriorated. The afternoon tea custom which has started in Paris has spread to the country house. Every afternoon we found the valet de chambre brought in his silver tray with tea-things arranged upon it as in England. The daughter of the house deftly dispensed her wares, and the other noticeable differences between England and France were—

the tea was weaker, the lumps of sugar larger, the teapot always had a silver strainer hanging from its spout to hold back the leaves, and instead of eating the cakes dry many of the people preferred to *tremper* them—that is to say, dip them in their tea and eat them soaked with that beverage. When visitors came to call, tea was immediately offered, as it is in Russia. Until lately Russia was the only country which ran us anywhere close in the matter of afternoon tea; but then in Russia tea is going on all day long, and the samovar is in constant requisition. In Russia, however, the tea is served in tumblers without milk, a piece of lemon being added to bring out the flavour. Russian tea is excellent; but then the very finest China tea goes to Russia, where the colour and the aroma are as much considered as these qualities are by a connoisseur of good wine.

PARIS HAS NOT COPIED THE RUSSIAN WAY OF DRINKING TEA,

but has adopted our thoroughly British institution and mode of enjoying that beverage at five o'clock and at five o'clock every afternoon the smart folk of the city may be seen enjoying their tea as to the manner born. Paris has been besieged, and has capitulated in favour of afternoon tea."

Mrs. Tweedie's inquiry whether the tea-drinking habit of the Parisian is the outcome of the exhibition of 1900 has brought a reply from Mr Edward F Langdale, one of the tea representatives at the exhibition. He says:—"Most assuredly yes. And I hope that by virtue of the office I held at the exhibition I may claim to give my opinion so decidedly. Acting under the influential auspices of their respective tea associations, and by the authority of the Indian and Ceylon Committee of the Royal Commission, Paris Exhibition, 1900, the representatives of the tea interests of India and Ceylon were able to do good work at the exhibition itself, and, what is more important, to lay the foundation in Paris of a trade or business which is, I believe, becoming the permanent one of which Mrs Alec Tweedie has now so agreeably treated. Tea interests, generally, are now in such a precarious state that all who are closely concerned with them are naturally grateful when the Press gives its powerful aid to find fresh outlets for the present over-production of tea. The following Press notice was written in 1900, and the opinions therein expressed are, I think, now being verified:—

"'Nothing of this kind has ever been done before in Paris, or has succeeded so well. The attempt to sell tea to the public at previous exhibitions has usually ended in disappointment. The object of the association, to popularise tea, is evidently been attained; the tea has become popular, and a nucleus has now been formed for a business which should be continued after the exhibition is at an end.'

"Mrs Tweedie also asks if the 'craze' is the result of any British invasion of the exhibition?

"I do not think so, for my own experience, so far as regards the Indian tea courts, was that our fellow-countrymen were more conspicuous by their absence than by their presence. The tea courts were the resort daily of some of the best French society, members of which were known to say that the Indian tea courts were the most chic of any in the exhibition, and that the Grand Prix should have been awarded for the manner in which the tea was served as well as for the goodness of the tea itself.

"As a further proof that the

TASTE FOR TEA IN FRANCE

became more general at the time of the exhibition, many people particularly those from the provinces bought small packets of tea to take home with them. These sales direct to the public were most encouraging for the prospects of tea, for they showed the desire of the purchasers to try and cultivate a taste for it. Also, they showed visitors to the exhibition that good tea is obtainable at as low a price as from 3 to 4 francs a pound instead of at such a prohibitive one as from 8 to 12 francs, which I often saw marked up in the shops in Paris.

"By the enterprise of India and Ceylon, particularly of Ceylon, tea is now often obtainable in the cup at many of the cafes, but the knowledge how to make it properly has yet to be gained. There are also depots and tea-rooms, run mostly by English people. One, very tastefully decorated, is an offshoot of the exhibition, and is situated nearly opposite the British Embassy. The proprietor is a French gentleman who evidently believes in the ultimate success of tea drinking in France. If only tea-rooms after the kind of those of our Aërated Bread Company's shops could be dotted about Paris, the middle classes would probably be secured and then, in course of time, the masses, who are as yet much averse from tea, and treat it as medicine. There is, however,

ONE DANGER AHEAD

which cannot be ignored—that is, that the French Government might increase the Customs duty, still as high, I believe, as 1 franc 25 cents per pound, and thus blight the hopes of importers of tea into France. Their hopes must rest on the Chambers of Commerce of France and England, between which two bodies there is evidently an excellent good feeling and understanding. At the time of the exhibition there was some talk of the duty on tea being increased. 'Hinc illæ lachrymæ!"

Another correspondent writes:—"It is not in Paris that a taste for tea is spreading. A week or two ago I happened to be in Rheims, and noticed that there was quite as much tea as coffee exposed to view in the grocers' windows. But, in provincial France, at least, there is still evidently a

PREJUDICE AGAINST TEA GROWN IN THE BRITISH DOMINIONS.

I am not enough of an expert in tea to tell from its appearance where it is grown. But perhaps you will allow me to quote some of the labels under which tea is sold in Rheims—a town, it should be remembered, which has a large English population. One sample was thus described. 'Thé de l'Ile Bourbon. Ce thé par son arôme et sa finesse est sans rival, ayant le gout du thé anglais de Ceylon, *il lui est supérieur*. (The italics are in the original). Another sort is 'Thé d'Annam grosses feuilles fort en théine. Se recommande pour boissons hygiéniques.' A third variety is described as 'Royal Souchong.—Thé noir, très digestif.'

"It is quite possible that all three are Indian or Cingalese blends masquerading under popular titles. May I, as an Anglo-Indian not in any way interested in the tea trade, suggests to Mr Langdale that Rheims, an important town in which Englishmen are already strongly represented in the cloth and champagne trade, might be a good scene for a crusade in support of Indian tea. The 'tea-habit' is already formed, but the Reimois is educated to believe that tea grown French colonies issuperior to the product of our

gardens, which is very much as if an English grocer were to advertise 'gooseberry' as superior to the wine of Sillery or Ay."—*H and C Mail* Dec. 19.

THE GROWTH OF A NEW INDUSTRY: ONIONS IN THE WEST INDIES.

Some twelve years ago there were probably no onions, to speak of, grown in the West Indies. Large supplies were consumed, and for these the colonies were dependent on importations. The profits arising from the cultivation of these onions went, not to West Indian agriculturists but to the onion growers of the Canary Islands, Bermuda, etc. In about 1890 an old Bermuda grower, resident in Antigua, put his practical knowledge to account and made an experiment in onion cultivation. The attempt was successful, and by 1896 he had ten acres under onion cultivation in the island. (See *West Indian Bulletin*, Vol. II, p. 163). The question had meanwhile been vigorously taken up by the Botanic Station, and in 1895 to '96, onion cultivation may be said to have attained the rank of a minor industry in Antigua. It has thriven year by year, and its present position may be gauged by the fact that last year, in addition to the large quantities consumed locally, Antigua was able to export over 27,000lb. of onions to the intercolonial and New York markets. The industry has also been attempted in other islands, where with the advantage of the valuable experience gained at Antigua, progress has naturally been more rapid. In Dominica experiments in growing onions from sets, imported by the Botanic Station, were made in 1899. The results proved that the conditions were suitable, and the experiments were repeated in 1900. One or two crates were exported, and gained a good report at New York. Last year both seeds and sets were imported, and the onions exported from the Agricultural School and the Botanic Station to New York were reported as being equal to any from Bermuda and Cuba. Montserrat has not been behindhand in endeavouring to found a new industry. The first efforts were made at the Experiment Stations, in 1900-01, and the cultivation has progressed so rapidly that last year Montserrat exported no less than 3,410 lb. of onions to various parts of the West Indies, and 450lb. to New York. In the growth of this comparatively small industry we have an excellent example of progress in the right direction. The imports of onions into the various colonies are large, and are still mainly obtained from outside sources. In 1900 Barbados imported onions to the value of £1,187, Grenada £737, British Guiana £2,833, St. Vincent £145. It has been conclusively shown that onions of excellent quality can be grown at Antigua, Montserrat and Dominica. Experiments are about to be made in other islands, and we trust that within a few years the West Indies will not only grow onions in sufficient quantity for local consumption, but also to maintain a valuable export trade with the United States and elsewhere.—West Indies *Agricultural News*, Nov. 22.

CASTILLOA AND COFFEE.

Mr J Hill, a coffee planter at Santa Anna, Salvador, is making the experiment of planting Castilloa elastica amongst the coffee trees on his plantation. Two years ago he planted six thousand castilloa trees, which have already reached a height of from one to two and half yards. There are betweeen thirty thousand and forty thousand castilloa trees one year old, and in this year he hopes to bring the total number of trees to sixty thousand. It seems as if at the comparatively high altitude at which the coffee plantation is situated, the castilloa trees grow somewhat slowly, and only future experience can show whether the yield of rubber is not affected thereby. Mr Hill appears to feel a little apprehensive regarding the effect of these trees upon his coffee. He writes according to the "Tropenpflanzer," 1902, p. 542: "Many condemn the mode of planting as likely to be prejudicial to the coffee when the rubber covers it, but I am going to try anyhow, and I will let you know later on how the thing works, so that others may profit by the experiment."

How the rubber trees will thrive in that locality I have no data to express an opinion upon, but I think I may reassure him on the question of influence of the castilloa trees upon his coffee. Castilloa elastica does not develop a dense crown, and could, therefore, hardly be considered a shade tree. Moreover, there is a considerable plot planted in exactly the same manner on the plantation at Las Cascadas, and while the rubber trees are doing extremely well, there is not the least evidence that they interfere with the bearing of the coffee trees. At the time of my visit to that plantation the coffee trees amongst the rubber trees were in full, rich bearing.—*India Rubber Journal*, Dec. 8.

SWEET POTATOES AND YAMS.

During the period of stress which our sugar-growing colonies in the West Indies are passing through pending the abolition of the foreign sugar bounties, the attention of the planters has naturally been given to other produce. In Barbados great success has been achieved in the cultivation of sweet potatoes and yams of the very best quality, and an endeavour is now being made to introduce these into this country. The sweet potato is a cheap and palatable vegetable, but a good yam is a positive luxury.

During a long residence in London I imported several barrels every year for my own use, and out of the numerous guests who tasted them at our table there was not one who did not highly appreciate them. I may add that here the flavour is even more delicious than in the West Indies, as the butter which is a vital ingredient in a well-cooked yam, is so much better.

I am returning to Barbados almost immediately but any information on this subject will be given by Messrs. W Pink and Sons of Portsmouth who are importing regular supplies. Receipts for various ways of cooking both sweet potatoes and yams re-sent out with every parcel.

Forster M. Alleyne, Legislative Council of Barbados.
—*Journal of the Society of Arts.*

A Rich Island.—The Southern Philippine Island known by the name of Paragua or Palawan, is now coming into prominence, says the *Straits Times*, Jan. 2nd. Captain William A. Phillips, Governor of the island, in speaking of the conditions, states that probably no part of the archipelago offers more inducements to capital than does Paragua. The vast forests containing rubber trees in great abundance are fortunes in themselves, saying nothing of the other industries,

FRESH BUTTER FOR INDIA.

[FROM OUR OWN CORRESPONDENT.]

A few years ago, so few as to be well within the memory of the present generation of Anglo-Indians, the Government of India brought out a young Scandinavian to initiate the people of this country into the mysteries of butter-making. It was an experiment, like many an other, conceived in the vague hope that something useful might come of it, but with only an indefinite idea as to how this something was to be accomplished. That a large proportion of the European inhabitants had from time immemorial been able to obtain only an oleagenous mess in place of butter, was the reason for attempting it, but very few looked upon it as anything else than a comparatively harmless method of wasting public funds.

Today, this experiment has become an established success. The young Scandinavian is the head of an industry which supplies well-to-do members of the European community in Calcutta and Simla with really first class butter, and which is likely to considerably extend its operations in the near future. Branches are being opened in Rangoon and in Darjeeling. Even Fort Sandeman, in the wilds of the distant frontier, is not too far away to share in the great boon of obtaining fresh butter.

The achievement is so remarkable, and its success is so important to the health of the European in this country, that it is worth while to visit Aligarh, the headquarters of the industry, to see how it has been accomplished. On a bright morning last November, your correspondent happened to be in the neighbourhood of the dairy. The latter is located in a big, substantially built enclosure standing in an open plain, some three miles from the civil stations. Around is a wide expanse of thin pasture broken with scrub and trees, the surface white and bare in patches where the soil is impregnated with "reh" salt, verdant in narrow belts where irrigation channels are situated. A wide gate, through which runs a light railway for conveying fodder, leads to a central building well separated from the sheds in which the cattle are stalled. This building is of solid masonry with great arched verandahs that make it delightfully cool. Within it the whole of the processes of manufacture are carried on.

The milk is brought in from the sheds, some of which are within the enclosure while others are located in neighbouring villages, and on arrival, goes at once into the separator. This separator is so small as to appear almost a toy. In reality, it can deal with the produce of five hundred milch kine daily. In appearance and size it is not unlike a tea-table with a kettle with two crooked spouts set on the top and various cogwheels below. On lifting the upper part of the kettle a humming-top like arrangement is disclosed within; which spins with giddy speed when the machinery is set in motion. The milk goes in above and is set whirring by the humming top. The heaviest constituents, which is the watery skim-milk, flies, by centrifugal action, to the circumference and pours in a continuous stream out of one of the spouts. The lightest constitutent, which is beautiful rich cream, takes on less of the centrifugal energy and gravitates to the centre where it is drawn off through the second spout. Milk, warm from the buffalo, is thus separated and there is none of the delay and exposure, with the attendant risk of turning sour, which awaits the time honoured process of standing for the cream to rise. The separation process is also infinitely more complete, almost the whole, instead of only a part, of the butter-making constituents, being turned to useful account. From the separator the cream goes straight into the churns, great barrels revolving on axles, with wooden beaters inside, by which it is shaken and jarred into butter. From the churns the butter is mechanically lifted to a round rotating wooden table, raised in the centre so as to be like a circular lectern and with a gutter around the edge. Here the great yellow mass is manipulated by the help of wooden spades and squeezed and washed. A wooden roller, thick at one end where the table is low and then at the other where the table rises into a peak in the centre, is fixed so as to revolve as the table rotates. The butter passes under the roller which squeezes it flat. On emerging it is turned and heaped by the use of the spades, water playing on it the while, so that before it has made the round and reached the roller again much of the butter-milk has been eliminated. The process is continued until the mass is completely consolidated.

The next process is even more interesting. It consists in the digging out with wooden spades of equal sizea lumps and the weighing and wrapping of them in paper. Up to this point the butter has not been touched by hand, but one thinks that this part of ths process is impossible without the aid of the fingers of the attendants. The operator stands, in big white apron, in front of the scales. In front of him is a small mountain of butter in either hand he has a small wooden spade. With lightening speed he transfers a lump to the scales, thence it passes on and is folded into clean white paper. The slightest miscalculation in the size of the spadeful he takes means a portion to be added or subtracted at the weighing, but so skilful does the workman become that hardly a correction is necessary. The spade picks up the exact amount, be it a quarter of a pound or a pound, that goes into a packet. There is no halt in the process and a human finger never touches the butter. From the time the milk enters the separator, to the moment when the paper packets of golden butter leave the ice house for the train, the whole of the handling is mechanical, wooden spades being the sole instruments employed to aid the machines in their task.

The milk used is that of buffaloes, and the only extraneous matter introduced, in the course of manufacture, is a microscopic amount of harmless vegetable essence which deepens the yellow of the pats. A cleaner, more wholesome, or speedier process it would be difficult to imagine. The rooms are cooled with ice, and the result of the care that is taken is that the butter can be conveyed immense distances by rail, without deterioration, even along routes where ice packing is impossible.

Condensing engines where ice is manufactured in great solid slabs, are attached to the dairy. Other plant is in course of erection which will eventually enable the churns and separator to be driven by steam, instead, as at present, by manual labour.

From the dairy the cattle sheds are easily reached. They are long, well elevated, and carefully paved structures, the sides open to the sunshine and the wind, the feeding troughs ample and convenient. Here one may see buffaloes that are a

revelation to the ordinary dweller in this country. A playful young bull, of the size of a growing elephant, sleek and covered with hair like fur, was getting its morning meal when your correspondent arrived upon the scene. It was the kind of animal to inspire ability to climb through the thorniest of fences in the shortest of time, but the genial proprietor did not hesitate to pat and caress the animal and the latter evidently appreciated the attention. Mangel-wurzels grown in the locality, and gram and butter milk, with any amount of green fodder, are what the buffaloes are given to eat. They also have grazing in the open. Their wonderful condition and the surprising quantity of milk they yield afford remarkable illustration of what care and good management will effect with the elsewhere neglected Indian buffalo.

The enterprise is entirely self-supporting and deserves the prosperity it has attained.—*Bombay Gazette*, Dec. 29.

TRADE IN STRAITS PRODUCTS FOR 1902.

The following is the report on certain products exported from Singapore, in which Ceylon is more or less interested :—

COPRA.—Export figures of this article shew a very marked increase over 1901, being indeed almost double what they were in that year, and as prices have ruled very high, touching at one time $11·25 per picul for Bali and similar types, this industry must have been an exceedingly remunerative one for those engaged in the cultivation of coconuts. Demand throughout the year has been good and a feature to be recorded is the steadily increasing consumption by local Oil Mills.

BLACK PEPPER.—From Jan./June prices varied from $29¾ to $33 and July/Dec. $29¾ to $37, value on 31st Dec. being $37. Supplies have increased about 15 per cent on last year and are likely to show a further increase in 1903. Stocks in Europe and America are considerably smaller than they were at the end of 1901, which proves that the consumption has exceeded production.

WHITE PEPPER opened in January at $53 (5 per cent loss in weight) and declined to $46½ in March, advancing again in June to $56½. Heavy arrivals in Aug./Sep. drove the price back again to $51½ but a recovery soon afterwards took place and the market advanced steadily to $61½ which is closing quotation. Had a number of the Sarawak plantations not been destroyed by floods, supplies would have shown an important increase, but as it is they total only about 7½ per cent above last year. The demand for the United Kingdom and Continent has been active and prices have kept firm throughout the last three or four months.

LIBERIAN COFFEE.—At the close of last year No. 1 Liberian Coffee was valued at about $19 per picul, and with a few fluctuations the price has advanced to $22. Quality on the whole shows an improvement, and less has been heard of claims for sourness said to be caused by defective curing. During the last two months supplies have been small and a good demand for India has led to as much as $24 being paid for small lots of good quality.

NUTMEGS AND MACE.—After a long period of depression during which 110s Nutmegs were sold as low as $44 per picul and Banda Mace $68, an active demand has sprung up, and prices have advanced to $65 for the former and $120 for the latter. The average quality of Nutmegs coming to market is far from satisfactory, and the proportion of shrivelled and unsound Nuts seems to increase every season. —*Straits Times*, Dec. 31.

AN EXPERT ON GREEN TEA.

Having seen a good deal of the green tea industry both here and in other countries perhaps a few views may be acceptable to my fellow tea men. As, I suppose, is but natural there appear to be very confused ideas prevalent in India regarding the varieties of green tea on the markets of the world, Indian planters seeming to think that it is a plain article, the same fundamentally throughout without regard to its outside appearance in the dry leaf which is diversified. It follows from this erroneous impression that many efforts are directed towards producing a nondescript style of tea, with the appearance of one kind and the characteristics of another. Now, if we are to follow the lead of Far Eastern countries and produce teas sufficiently close to theirs to compete with them successfully in countries where they have established the national taste it is clear that we should study the characteristics of their teas thoroughly and in working to our end endeavour to follow out the principles on which their teas are made.

To begin with, I have been informed by several tea makers that their ambition was to reproduce the round roll of China hysons, gun-powders and imperials. Now these same tea makers were producing their green tea by the steam process. The result of rolling steam-made tea in the Chinese fashion would be to produce a tea which would possess a liquor of quite a different character to that of Chinese tea, and consequently the tea would not reproduce Chinese, and having the Chinese roll would equally not represent any other description.

The two standard descriptions of green tea are, of course, the Chinese and the Japanese, and they differ very fundamentally in their character. The initial operation which destroys the fermenting principle of the tea leaf, and thus divides green (or unfermented) from black (or fermented) tea manufacture is differently carried out in China and Japan. In both countries heat is the agent used for sterilising the fresh leaf, after which operation it is not subject to fermentation, but the heat is applied in a different manner in the two countries. In China dry heat is used ; the leaf is thrown upon open pans heated by stoves, and the contact of the leaf with the heated metal causes the temperature to rise above the point at which the natural ferment in the leaf dies. This preserves the whole constituents in the leaf, which is, after being thoroughly panned, rolled and dried in the usual manner, and panned again at the end of the manufacture to bring up the grey-green colour characteristic of the dry tea. The Chinese roll by hand in a manner to secure the round curly teas with which the market is familiar. Very good imitations of these teas are produced in the North-West of India tea estates. These North-Western teas truly represent China characteristics in form, colour and cup, and are as they should be, for this style of manufacture. The China teas are pungent and bitter, of great strength with a darkish liquor, but they do not possess the delicacy of Japan teas for a reason to be explained.

The Japanese, on the other hand, sterilise their fresh tea leaf by the moist heat of boiling water, which from the first differentiates their manufacture from that of China. The leaf treated in this way becomes wet, and in the process of rolling, which immediately follows, a good deal of the juice of the leaf is expressed and comes away

with the hot water with which the leaf is saturated. Simple as this fact may seem, it makes all the difference in the cup character between Chinese and Japanese tea. In Japanese tea manufacture, as stated, a good deal of the juice of the tea leaf is expressed and much of the bitter property is lost, the resulting tea being much more delicate in flavour than the Chinese variety, in which all these bitter properties are preserved. An analysis of the juice naturally expressed with the excess of water shows it to consist chiefly of tannin, a substance which is not advisable in excess in any tea. Japanese tea is therefore more wholesome as well as more distinguished in flavour than Chinese, and the fact made it a universal favourite in the great tea-drinking countries of America. The Japanese system of green tea-making is very fairly represented by the Ceylon patent steam process of Mr. Drummond Deane, and the teas so produced answer very well to Japanese teas in cup characteristics. To show the confusion of thought which exists in India, and the danger which arises from arguing on *a priori* principles from very insufficient knowledge, I may here state that some of the juice expressed in the steam process of green tea-making was submitted to a scientific man for analysis and report. He stated it to consist chiefly of tannin, but volunteered the statement that the system of tea manufacture by which this juice was expressed was erroneous and faulty, because in his opinion all the constituents of the leaf should be preserved. This was indeed a case of the cobbler going beyond his last, for be it noted the "expert" condemned the very process by which the superior delicacy and purity of Japanese teas are secured. The lesson to be learned from this case, of course, is that it is necessary to know the history and actual living facts of an article before setting up as a critic on its manufacture. Japanese tea has obtained its vogue by its special characteristics, and these characteristics are obtained by the incidental circumstances of its manufacture, the loss of a certain proportion of tannin, etc., in manipulating the wet leaf. It follows, therefore, that when we are endeavouring to reproduce this article, which is such an established favourite, it is absurd to say off-hand that it is wrong in principle to lose any of the constituents of the leaf; when by the very loss of that excess the superior delicacy characteristic of the article is produced.

There are thus two well-established descriptions of green tea, the strong, darkish liquoring bitter teas of China, rolled round or curly; and the delicate, pale liquoring, pungent teas of Japan, rolled straight. The latter roll can be very well reproduced in an ordinary black tea rolling machine, but as yet the China roll can only be imitated by hand. The steam process possesses great advantages in convenience, for the penetrative action of the vapour renders the sterilising of the leaf very rapid indeed, and large quantities can be readily dealt with. But the teas so made, possessing Japanese characteristics in cup, it stands to reason should be rolled in the Japanese manner to secure the familiar Japanese appearance. To roll steam teas to the China appearance most necessarily make a tea which is neither Japanese nor Chinese in style. The addition of panning either by hand or machine gives the dry leaf the appearance of the Chinese and Japanese teas, and where these countries add foreign ingredients to secure colour, we can very readily secure the same pure, but I deprecate the mixing up of styles, that is, the roll of one with the cup of the other.

THEA VIRIDIS.

—*Indian Planting and Gardening*, Jan. 10.

RUBBER MARKETS.

[MESSRS. LEWIS & PEAT REPORT.]

Dec 12.—Ceylon—21 cases bought in. Borneo—8 cases bought in.

Nyassaland—247 bags sold; small red and white clean ball, 2s 11d to 2s 11½d; ditto part heated 2s 5d to 2s 9d; good rooty ball 2s 7d; strong white ball 2s 9¾d to 2s 10d per pound.

Dec. 19.—Para.—We have had an excited market during the week, and prices have rapidly advanced fully 3d to 4d per pound on the average. Fine hard from 3s 5d to 3s 8d spot, and 3s 8½d forward; fine soft, 3s 2d to 3s d spot and forward; scrapy and Peruvian ball, 2s 9d to 3s; Mollendo 3s 2½d to 3s 5½d. Receipts continue very moderate and all medium grades are in active request, but very scarce.—*India-Rubber Journal*, Dec. 22.

PRODUCE AND PLANTING.

The report on last year's TRADE IN KHORASSAN sent by Lieutenant-Colonel Whyte, Acting British ConsulGeneral at Meshed, shows that although there is a preponderance of Russian trade in Khorassan, practically the entire foreign trade of Seistan is in British hands. The value of British and British Indian imports during 1901-2 was £131,775. Chief among British and British Indian imports to Khorassan and Seistan is tea. This is and should continue to be as safe a British monopoly as sugar is a Russian monopoly. There is said to have been a large accumulation of India tea in Meshed at the end of 1900-01, and the tea trade during 1901-02 is described as not having been as brisk in consequence as in recent years. The taste for tea is strongly developed, even among the poorer classes of Persians, and there is always likely to be a strong and steady demand for it in Khorassan and Seistan. The value of the tea imported by the Bundar Abbas, Bushire and Seistan routes, was £50,267, but a considerable proportion of the tea brought by the two former routes is said to have been Chinese tea for exportation to Trans-Caspia and Turkestan. The following note of prices ruling in Meshed in November, 1902, has been prepared by Mr. T J Greensill, Government canvasser for trade in Khorassan and Seistan:—Tea.—There are several kinds of both black and green sold here, but the most in demand are the following:—Black Tea.—Fine Pekoe leaf—wiry and even with few tips—known here as "Kalami" present rate 20 krans (kran equals 4d to 5d) per Meshed "man" (the Meshed tea "man" is 7 lb), with a credit of fifteen months, equivalent to 17 krans cash. Leafy kinds are not much in demand, but some would sell at 20 krans, carrying twenty to twenty-five months' credit equivalent to 15 to 16 krans cash. Green Tea.—Gunpowder—bold, even leaf, coloured greenish - known as "Sabz," present rate 21 krans per Meshed "man" (7 lb), with four months' credit, equivalent to about 20 krans cash. For natural unfaced or faced there is no demand, but coloured after the China style, in India known as Bombay tea, would find ready sale if not too expensive. Heavy soap-stoned greens are rejected at once. White or silver-tipped tea, known here as "Lamsa," is really a mixed tea, consisting of about 15 per cent silver tips and about 85 per cent uneven orange Pekoe and Pekoe leaf, and comes chiefly from Java, usually packed in 5 lb lead-lined wooden boxes, and sells here at 40 krans per "man" (7 lb), with twelve months' credit, which is equivalent to about 35 krans cash. Those with more white tips fetch slightly better rates, but the demand is very limited.

THE CAPE COLONY IMPORTED TEA during 1901 to the value of £138,092, while the value of the tea imported into Natal was £37,401.

IN A REVIEW OF THE COCOA TRADE the *Grocer* says:—"This article is of yearly increasing importance, and each branch of the trade is continually making fresh strides towards a higher point of advancement than it had ever reached before. Apart from mere assertions, statistics prove that the quantities received and delivered in the United Kingdom are far ahead of those in previous years, and, confining the figures as taken from the official accounts to this year and last, it will be seen that the total importations of raw cocoa during the past eleven months have amounted to 53,009,256 lb, against 49,406,166 lb, in the same period of 1901. A corresponding improvement was observable in the duty-paid entries for home use, which were 42,619 394lb, in comparison with 39,833,326lb last year; and the quantity taken for exportation was also much heavier than in the first eleven months of 1901, being 12,253,700 lb, instead of 10,710,189 lb. As a result of these extra outgoings, the bonded stock in the U. K., as officially stated, was by the 30th ult. reduced to 10,030,000lb, against 15,097,000lb in the preceding year. As a defect which mars the completeness of the Board of Trade returns it may be noticed here, in passing that the compilers do not distinguish one description of cocoa from another, and keep colonial separate from foreign sorts. The latter mode, it is but fair to say, is that regularly adopted by the authorities at the Port of London, where the landings and clearances of the leading kinds of cocoa are kept totally distinct from each other. They are on that account doubly interesting to the importer, dealer, and exporter, who carefully note every new movement that shows itself in this article of commerce and manufacture. To follow out this plan we therefore give particulars of both colonial and foreign cocoa as they enter and leave London, from which it will be observed that of the two main growths the former forms the chief portion of what is landed and delivered from time to time as the season progresses. Thus, in the fi s fifty weeks of the present year, in comparison with those in 1901, the receipts and clearances of cocoa, as returned at this port, have been as annexed:—

	Landings.		Home deliveries.	
Colonial pkgs.	102,450	87,850	72,700	72,550
Ceylon	35,350	32,750	25,850	12,200
Foreign	80,850	89,500	62,500	58,700
Totals ..	218,650	210,100	161,050	143,450

	Exports.		Stocks, December 13.	
Colonial pkgs.	30,600	20,500	22 700	24,900
Ceylon	17,600	10,400	6,600	14,400
Foreign	24,900	30,600	33,700	41,400
Totals	73,100	61,500	63,000	80,700

"These totals confirm in a remarkable manner the general outlines of the Board of Trade returns above alluded to where in most cases the amounts entered during 1902 exhibited appreciable increases over those in 1901. It is, consequently, no wonder that, with an aggregate supply more than sufficient to satisfy all requirements (though leaving stocks materially lighter than in last December) prices of cocoa almost throughout the year have been materially below those in 1901. For instance, under the influence of a large crop of Trinidad cocoa now beginning to arrive, fine red quality has latterly been sold at 65s. per cwt, whereas last year it was fetching over 70s. The same may be said of the Grenada description, which offers at 59s to 62s, instead of at 63s to 68s in 1901, or 8s per owt cheaper than the article was in 1900. African cocoa has, however, been little affected by the depression existing for colonial sorts, as its principal market is in Liverpool, where between 4,000 and 5,000 bags come in every week from St Thome, via Lisbon, and about 15,000 bags have already been sold, sub rosa, for arrival next February on terms equivalent to those for 'spot' parcels in London. Guayaquil, on the contrary, is an exception to the prevailing depreciation in values, and is actually shillings dearer than it was a year ago. Beyond this there are faint signs of improvement or better prices in the cocoa market, owing to the fact that supplies nearly everywhere are most abundant, and more than equal to the demands from consumers."

As is well known, the various SOUTH AMERICAN STATES play a very important part in the production of produce of all kinds. Venezuela's chief industry is COFFEE PLANTING, and its greatest exports are, in the order of importance named:—Coffee, cocoa, hides and skins, timber, coprah, and cotton. Bolivia is a wonderfully productive country, and it is difficult to imagine a tree, grain, fruit, or vegetable that could not be successfully grown. Bolivia grows barley, oats, wheat, beans, potatoes, maize, and all kinds of vegetables and fruits upon the uplands; and oranges, pineapples, bananas, coffee, rice, cocoa, chocolate, vanilla, sugar-cane, manioc and rubber in the forest-covered regions. There are others as the quinua, a grain indigenous to the mountain regions; the oca, a kind of potato; the cherimoya or custard-apple; the tembe, a fruit of a species of palm; the guava, the granadilla, the fruit of the passion-flower, and many more. Thus great areas of the country may be designated huge gardens, and there are millions of acres of the finest timber, watered by navigable rivers. British Honduras has not merely its mahogany and logwood to depend upon, but vanilla cacao, rubber, sapodilla, and other valuable products, as well as useful woods of many sorts, are indigenous and abundant, and the soil in many large areas is peculiarly fertile and suitable for the growth of sugar cane. Bananas, oranges, rice, and maize are only a few of the products which grow luxuriantly, but scarcely anything is done with them, and the bounteousness of nature has made existence so easy that the inhabitants have lived almost solely by cutting their mahogany. Even the natural forest produce remains ungathered. The vanilla grows so abundantly that the traveller when riding through the forest roads has often to clear away the vine of this valuable orchid with his machete before he can pass. The cochune nut, which yields the finest table oil, grows in immense quantities, and is also entirely wasted.—*H and C Mail*, Dec. 26.

"COCONUT OIL PRODUCTS."

New York, Nov. 12.

An article in the Oct. 20th issue of the Oil, Paint and Drug Reporter under the heading of "Copra Products in Marseilles" has come before my notice and being personally connected with the largest refiners of these goods, I feel justified in making some little comment on the subject.

I trust that you will give me an opportunity of correcting any possible misunderstanding to which former statements may have given rise that the Germans and French are ahead of British manufacturers in this particular industry.

The demand for high grade and guaranteed pure, coconut butter is increasing with enormous rapidity in this country, among both the chocolate and candy manufacturers as an entirely satisfactory substitute for cocoa butter, and among cake and biscuit makers and confectioners generally in place of lard and butter.

In view of this I think it is only fair that Johnny Bull should get his due and it may interest your readers to know that considerably more coconut

butter is made and sold in England than by the whole of the factories manufacturing this article on the Continent and America combined.

Toward the end of the article in your Oct. 20th. issue the writer says: "English manufacturers have lately learned something of the bleaching method as in use here (meaning Marseilles) and are employing it."

I venture to suggest that "lately" is hardly the right word to use, for the manufacture in England of a hard coconut butter was undertaken about sixteen years ago by the predecessors of Loders & Nucoline, of London.

Furthermore, the "bleaching" is not the serious difficulty, nor is the elimination of the three volatile fatty acids mentioned in your articles, viz: caproic, capric and caprylic.

The value of a perfect process lies more in the entire elimination of the non-volatile fatty acids and in certain preliminary and final treatments.

The large chocolate manufacturers in this country make a very thorough and scientific examination of their raw materials; they require coconut butter to be guaranteed pure and to consist only of the searine of oil of the coconut (Cocos nucifera and Cocos butyracea). It must contain no extraneous matter, and yet have a high melting point in order that the candies produced with it may "stand up" well in hot weather.

It must also be refined to a nicety and be absolutely neutral.

The patents and secrets of manipulation used in producing a first-class coconut butter are exceedingly valuable, no doubt, but there is no royal road to the manufacture, and when a perfect product is aimed at, great care at all stages of the process is the first consideration.

As "touchin' on and appertainin' to" this subject, the following reprint of an extract from the recent controversy in the English scientific journals may be found of interest.

The original article which was headed "Utilizing the Coconut," concluded by saying:—

The coconut is utilised entirely—the fiber from the husk being used for coconut mats, matting and brushes; the shell is used for fuel, and the cake which remains in the hydraulic press after squeezing out all the oil is a valuable feeding cake for cattle, whilst the dreg which is extracted in the refining of the oil is very largely used for making soap and candles.

The manufacture of "desiccated coconut" was not, however, included. This is very largely an American industry and right in New York over 30,000 selected nuts are treated daily by the Dunham Manufacturing Co., who own large palm plantations in Cuba.—*Oil, Paint and Drug Reporter.*

COCONUT CULTIVATION IN TRAVANCORE.

The Settlement Operations in Travancore have involved the counting of nearly 800,000 coconut trees, and as an area of slightly over ten thousand acres, or one-sixth of the occupied area in the State, pays no taxes, we may take it that the number of coconut palms is far in excess of that which has been accounted for. Indeed, if we bear in mind that very many years ago, it was calculated that there were twenty millions of coconut palm trees in the south-west of Ceylon alone, then Travancore ought surely to be credited with a good deal over a million trees for all along the coast as well as in the belt of flat country which runs ten miles inland, there is nothing but a dense, unbroken, mass of coconut and areca groves, and forty coconut trees to the acre is a very moderate computation.

So important is the coconut industry in Travancore that on certain Crown lands, in addition to the money tax on coconut trees, the tenant has to contribute one coconut frond for every anna of his assessment and about twenty thousand fronds are thus paid in on these particular lands. The staple industry in Travancore is the cultivation of the coconut tree, rice being grown only in the hollows between the laterite ridges and the amount reaped does not suffice even for home consumption. Lord Curzon, when he visited the State two years ago, remarked with characteristic humour: "Here every man has three acres and a palm tree." Hereupon, Mr Mackenzie, the British Resident, told us not long afterwards, that if Lord Curzon had said: "three acres and thirty palm trees," he would have been much nearer the truth, and we may add that his analysis shows that the average holding of a ryot is two and one-third acres, with thirty-five fruit trees.

The assessment of lands in Travancore is all in favour of the taxpayer, for the average demand on garden and dry lands is Re. 1 1 8, in addition to an assessment ranging from eight pies to one anna eight pies on each coconut tree, and as each tree is estimated to bring in from R2 to R4 a year, the poorest ryot can very well afford to meet the assessment, more especially as the soil, the warmth and humidity of the climate, the neighbourhood of the sea, the brackish lakes, and the equable distribution of the rainfall are all congenial to the growth of the tree. In some parts no labour whatever is required and the tree almost grows wild. It has been observed that the cultivation increases steadily from year to year, but we fear, this is not altogether to be commended, for though within recent years new economic uses have been found for the palm, among others, the manufacture of coconut butter, there is always the danger of overproduction. Moreover, the overstocking of gardens is calculated to produce deterioration in the quality of the fruit. Up to now, nothing of this sort has perhaps occurred, and a few years ago at a local exhibition, a bunch of coconuts with 153 nuts was on show, and another, with ninety-five, though the number required in the prize list was fixed at no more than forty. Of course every tree does not bear like this, but, as a rule, the Travancore coconut produces very prolifically, and would be a far larger source of income to the husbandman were it not for the ravages of its numerous insect and animal enemies. Among these are two very destructive coleopterous beetles. Then, there are the rats, monkeys, toddy cats, flying squirrels and other rodents, which do considerable damage to plantations. The natives are so supine in all matters affecting their own welfare that beyond an occasional rat hunt or an excursion after beetles, undertaken at distant and irregular intervals, they have never realised the great value of combining and organising their forces with the object of destroying these enemies of theirs. This is one of those matters in which the enlightened and progressive Government of the State might usefully undertake to educate the ryots, with profit both to the State coffers and to the purse of the taxpayer. —"C" *in Capital.*

BUTTER MAKING: A NEW INVENTION.

We are indebted to Mr. Thos. Christy, F.L.S. for the following:—

"Now I am going to give you a few lines upon an experiment which may appear to you improbable, but I have tried it myself. Take a small quantity of cream, say a pint, or, if you can afford it, go up to a quart, get a thin muslin cloth and on this place a large sheet of filtering paper, or blotting paper will do for the experiment, then suspend the muslin at the four corners and pour the cream into it gently. You will in a few minutes find that the water has run out of the cream, and you can then fold the butter together, press it slightly, and when you have added a little salt it is ready to eat. I may tell you that the filtering paper appears to be the only means by which the inventor can get any protection or return for his invention, and it is only fair to say that the inventor is an American. There is no waste. In fact the volume of butter coming from this cream is about 5 per cent to 20 per cent more than if it is made in a churn."

Residents at Nuwara Eliya and planters' wives everywhere, will, we have no doubt, be among the first to experiment on the lines of the above discovery. It is as simple and would seem to be as notable, as the case of Columbus and the egg; but let us have a local practical report, before saying more.

A "planter's wife," who had heard of the above in time to make an experiment, writes:—"I don't think that butter experiment will be a success. I have carried out directions to the letter; water is dripping out slowly, but cream is still cream and not butter and it has been dripping for an hour. I will have another try, but cream is *very* scarce with us just now. I think the blotting paper we have is too thick; if I had proper filtering paper, results might be different. The experiment is worth trying."—An hour later: "I really think that with proper paper, the butter *will* be a success, only it takes about 1½ hour to extract all the butter-milk."—We are sending a few sheets of chemical filtering paper, to enable a proper trial to be made.

MR. ALEX WHYTE, OF EAST AFRICA.

Some readers of the *T.A.* would have noticed a short time ago in its columns, a letter from Mr ALEX WHYTE, the Naturalist, who was then on his way home invalided from East Africa. The doctors then considered an operation would be necessary and ordered him home. He has since been in hospital in Edinburgh, I understand, but the more up-to-date surgeons there took a more cheerful view of his case, and he has been improving gradually without undergoing any operation whatever. He hopes to be able to come to London to his sister's, Mrs Millar for Christmas, being due in Chelsea about the 23rd, I believe, and is not without confidence that he will in time be sufficiently confirmed in health to return to work and complete his survey of the area round Mombasa, which he undertook to visit for Government and report on the best products to be introduced into the district. After finishing this task, Mr Whyte hopes to retire and come home for good. He has done excellent work of recent years for the British Government in Africa, and his friends will all be pleased to know that there is a good prospect that he may be able to complete it.—*London Cor.*, Dec. 19.

A NEW MANURE FOR RICE FIELDS.

A writer in the *Madras Mail* of January 13, says:—"It has been brought to my notice by cultivators now and then, and it is my experience too, that 'tobacco backbones' now either thrown out or sold at low prices for *beedi* manufacture, can be utilised as a useful manure for rice fields—especially for first crop, that is Kar produce. Lands once cultivated with this manure continue to yield very favourable crops for the next two years. I wish that landowners and Zemindars would consider the matter and make a trial."

TROPICAL PRODUCTS IN COOK ISLANDS.

NEW ZEALAND EXPERT TO REPORT.

Mr. T W Kirk, chief of the division of biology and horticulture of the Agricultural Department, left by the "Countess of Ranfurly" on Friday for our new possessions, the Cook Islands, under instructions from the New Zealand Government, to report as to the growth and production of coffee, cotton, vanilla, cocoa, citrus and other fruits in these islands. Mr. W A Boucher, one of the fruit experts of the Department, who has had considerable experience of the growth of citrus fruits in California, accompanies him; the idea of the Government evidently being to ascertain what steps are necessary to encourage the growth of tropical products in this portion of New Zealand's territory.—*Auckland News*, Dec. 18.

PRECIOUS STONES IN THE UNITED STATES:

IMPORTS AT NEW YORK IN ONE YEAR OVER £5,000,000.

Nearly every mail brings us one or more useful publications from the United States authorities, in their Agricultural, Mineral or Scientific Departments. The latest is from the "Department of the Interior"—U. S. Geological Survey—and is a pamphlet on "The Production of Precious Stones" by George F. Kunz. We receive, indeed, two carefully compiled summaries of the results for 1900 and 1901; and to make his information complete for 1902, Professor Kunz is anxious that we should give him all possible information regarding the gems, plumbago and other minerals of Ceylon. It will be inferred from this that attention is not confined to the outturn of precious stones in the United States, although that is much more considerable than we had at all conceived. Diamonds in Montana and Georgia, sapphire and corundum in Montana, ruby, golden beryl and moonstone in North Carolina, varieties of quartz (amethyst, etc.)

turquoise and garnets in half-a-dozen States, tourmaline in California, opal in New Mexico, afford evidence of the richness in gems of many of the American States. But the country is so rich that far more than all the local production is absorbed; for the value of precious stones imported in 1901 at New York alone was 24½ million dollars, quite five million pounds sterling! But we must quote Mr. Kunz's pithy introduction to his Report for 1901:—

The chief points of interest concerning precious stones in the United States during the year 1901 are:—

(1) The finding of a diamond in Lee County, Ga., which adds a new locality to those previously known; (2) the increased yield of sapphires in Fergus County, Mont., where two companies are now engaged, and further exploration for the fancy-colored sapphires at Rock Creek, Granite County, in the same State; (3) an extensive output of rhodolite garnets in the Cowee Valley, Macon County, N C, and also considerable mining in other parts of that State for blue, green and yellow beryls, amethyst and the new emerald-matrix; (4) continued activity in the remarkable locality for colored tourmalines at Mesa Grande, San Diego County, Cal., and the discovery of a new deposit adjacent to the first; (5) further work at several chrysoprase localities near Visalia, Cal., and the purchase or control of them secured by a company; (6) sustained and enlarged production of turquoises, chiefly in New Mexico, where several important companies are actively engaged in mining them, and the discovery of new turquoise localities in Colarado and Nevada; (7) the finding of epidote crystals, magnificent in size and colour, at Prince of Wales Island, Alaska; (8) and the discovery of a beautiful jade-like compact idocrase Siskiyou County, Cal.

The importation of precious stones for the year 1901 at the port of New York amounted to $24,500,000. The importation of diamonds has exceeded that of any previous year, and never have larger or finer stones been brought into the United States. Emeralds have greatly increased in public favour; and coral, long out of fashion, has once more become popular.

Although turquoise is now mined by six diffrent companies, and they all had fair yields, the popularity of the stone has been such that the entire product was consumed.

The first year of the new century has been the greatest in the history of the precious stone industry in the United States.

Never has the prosperity and growth of a country been more faithfully indicated, as if by a sensitive barometer, than by the wonderful increase in values and business in the jewelry trade in the United States during the past year. Never were more diamonds, pearls or emeralds sold, nor did fine gems ever before command better prices, nor were they ever more firmly held; and yet diamonds are likely to advance still further during the present year.

Not since the famous looting of the Chinese Summer-Palace in 1862 have so many treasures of jade, rock-crystal, pearls and other precious-stone objects reached not only this country but every country in Europe. The distressing fact remains that many objects, such as an altar set, or a writing set, or the funeral offering at the tomb of an emperor, empress or a noble, and made up of two or three pieces, were divided among several soldiers. Often a superb scepter, or some similar object, will have upon its upper side a thick coating of dirt, the firmly knit dust of ages, and the lower side will be as clean as it was when laid upon the tomb a century or more ago. No class of objects, whether the seal of the imperial post-office, or the tomb ornaments of generations ago, or the name of an emperor in jade, escaped the rapacity of the soldiers, who would secrete them in their baggage with other hard stones, or with metal objects, and then carry them in this crude manner halfway round the globe, thus breaking, scratching and nicking objects of priceless and historic value. Never has the more open boast of 'loot' been made with the memory of man. Frequently the objects offered for sale have a complete history, as having been the jade tablets of some famous altar.

Thus three times has China been sacked of its priceless, precious Yu jade objects—at the looting of the Summer Palace, again during the Japan-China war, and finally in the late international war with China; so that today New York, Berlin, London and Paris hold more such objects than any Chinese city.

The Carolina ruby is not first-class; but the amethysts and moonstones are good; Montana sapphires are well spoken of, and so are the turquoises of Colorado. The following curious bit of information is given in regard to "amber":—

Dr. Hapke mentions a single enormous piece weighing 3,125 kilograms, 6.875 pounds, of mingled straw colour and greenish yellow, which had been found in the 70's by some fishermen in Langlutjensand. Other discoveries had also been made in clay and sand in Binnenlande. This amber of the north-west coast rarely shows enclosures, as it is mostly opaque or subtranslucent.

We have more than once mentioned the close alliance between the diamond, amber, plumbago, coal, peat and petroleum—all having their basis in carbon. Most people dispute the place of amber in the list; but a reference to authority shows that the percentage of carbon is between 80 and 90 per cent.

Dr. Kunz gives a good deal of information in regard to precious stones in Borneo; but he does not seem to have seen our publication on "Gold, Gems and Pearls in Ceylon," so slight are his references to our island. We must enlighten him as far as we can; and he is sure to learn a great deal further at the St. Louis Exposition in 1904.

THE TEA MOSQUITO.

The hunting and tracking to its lair, of the tea-mosquito, by the scientific officer to the Indian Tea Association, Mr Harold H Mann, B Sc., forms the interesting subject of a pamphlet recently issued. This insect is a totally different fellow from the human blood-sucker we are acquainted with in Calcutta. He has four wings; ours has only two. The tea pest is a plant-bug; the house mosquito is a fly, and in its earlier stages is an aquatic grub totally different in every particular from the mosquito itself. The planter's pest passes its early stages in a form not widely different in appearance or habits (except in the absence of wings) from that of the adult insect, The non-recognition of this ab-

solute distinction has led to much lack of comprehension, and many mistakes in treatment of the insect

The tracking down of the little rascal by Mr Mann until he found its place of hibernation in the tea bush itself, is well told in the pamphlet, and deserves to be widely read by all interested in the cultivation of tea. Mr Mann, like all careful scientists, is very chary in making large generalisations, from a few experiments But he seems to be on the right track. These experiments, along the lines of his working hyphothesis, all confirmed each other in their results, and it looks as if he had not only found out all about the nature of this expensive pest, but has also been able to put tea planters in possession of the means of ridding themselves of what hitherto has been the perennial cause of blighted leaf entailing heavy loss. One hundred and fifty gallons of a very cheap emulsion, of which a pound or two of country soap and two gallons of low kerosine oil form the basis, are all that an acre of tea plants require. It has to be put on in a fine cloud-like form of spray about the end of February, and Mr Mann says that the best instrument for doing this is one made by the Goulds' Manufacturing Co., New York, and sold by Messrs. Jessop & Co., Calcutta.

The Tea Association never did a better stroke of business than when they appointed a scientific expert to fight the enemies of the tea plant. Every other crop has its own specific enemies, but as these crops are not raised like tea, by European capital under European management, the enemies of the crops get leave to commit ravages as they please. The success which has followed the efforts of the Tea Association ought to stimulate our paternal Government to put their Bureau of Agriculture in efficient working order, and to put thoroughly trained and well-equipped scientists on to every crop that is raised in India. If they would fight the enemies of cotton, jute, hemp, wheat, rice, the oil seeds, and other chief products of the soil as Mr Mann has fought the pests of Assam, they would deserve to have their memories perpetuated by statues or by hospitals or in any other manner a grateful people might devise. After all, let it be remembered that agriculture is the first and prime asset of the inhabitants of India. When it fails, everything else is wrong.—*Capital*, Dec. 24.

PLANTING NOTES.

Coarse Plucking: A Warning. — The Ceylon Association deserves credit for its most timely warning, in view of the recent rise in the market and the natural tendency of local producers to return to coarse plucking; but we trust the latter will do all in their power to falsify the anticipations of the London buyers who apparently regard India as alone understanding the necessity for controlling its output. The warning cannot be too sternly and persistently emphasised. By fine and careful plucking the market has been improved and now, when from this and other causes supply and demand is becoming somewhat equalised, it would be genuinely suicidal were planters to allow their discretion to be eclipsed by a desire for quantity and return to coarse plucking.

Para Rubber doing so well at 1,600 feet elevation as Mr. F. J. Holloway reports on page 543, is a very interesting fact which may tend to increase the area over which this kind of rubber can be profitably cultivated in Ceylon.

A New Style of Tea Drier—is to be introduced, in which the tea to be dried is steam-heated *in vacuo*, Certain advantages are claimed for the new process, but having some experience of machines in which vacuum processes are employed, we are inclined to think that it will prove troublesome and costly.—*Indian Planting and Gardening*, Jan. 10.

The Lake-fly Nuisance.—Dr. Willey elsewhere replies to Mr. Theobald's suggestion that, to destroy the lake-fly nuisance, Colombo Lake should be emptied and refilled with sea-water. His trenchant letter scarcely leaves room for hope that the scheme will be generally regarded as either imperative or practicable! But experiments are first required.

The Cultivation of "Onions"—in West Indian islands is described on page 534, as "the development of a new industry," and it causes us to enquire why more is not done in Ceylon in growing this useful vegetable? That there is great room for a home industry is shown by the fact that during the past five years we imported "Onions" into Ceylon as follows:—1898=131,003 cwt., R786,019; 1899 148,281 cwt., R444,844; 1900 157,116 cwt., R471 350; 1901 161,927 cwt., R582,578; 11 months of 1902 151 558 cwt., R454,832.

How Long will Green Tea Continue to Boom?—This is a question many in Ceylon would like answered. That it is booming now, no one will deny, and we have heard of low-country teas recently having sold at 36 cents, plus 5 cents bonus, bringing the seller 41 cents—considerably over what his black teas would fetch. The great caution shown by buyers seems to indicate that prices will not be maintained. For instance when prices were at 32 and 33 cents buyers readily took contracts. Now that 34, 35 and 36 cents are obtained buyers strictly refrain from making contracts, evidently believing that green tea has already reached its high water mark. Referring to a recent allusion of ours to these contracts, *Indian Gardening and Planting* of January 10th, just to hand, says:—

"These transactions certainly offer a good inducement to Indian planters to follow suit. 35 cents, or 5 annas 7 pies steady average without any anxiety whatever as to the rise and fall of the market, would pay very many concerns well, to say nothing of the bonus which would defray the extra cost of machinery. The contracts are, of course, for uncoloured tea, and it should not be difficult, considering the excellent quality of green tea turned out in India, for some of these contracts to be secured locally. The effect upon the development of the new industry of such arrangements must be most marked, for the buying contractors will necessarily make every effort to get the tea into consumption."

Correspondence.

To the Editor.

"PINEHURST" TEA IN AMERICA.

Toronto, Dec. 9th, 1902.

DEAR SIR,—I read with interest the editorial in your issue of October 22nd, was highly amused by it, and think it is the proper spirit in which to take any statements that appear in the Press about the "Pinehurst Tea Plantation" in America, for it is a huge joke; but when your article went on to state that "The Pinehurst Plantation" accomplished the publicity that it got in "The Boston Herald," for the mere writing of the said article, then you evidently do not understand newspaper methods here. If you think "The Boston Herald" would allow any institution or person to boom itself at the expense of the proprietors of the "Herald," then you are mistaken. Every line of the article you allude to was paid for, and paid roundly for, and in fact it is articles like this that bring around the donations from the Government of $10,000 to $20 000 to help on the "experiments" of the "Pinehurst Plantation." Therefore when you reflect on your Commissioner for not getting similar articles inserted free, you are doing him an injustice. I will venture to say that Ceylon tea has had more free reading articles in the Press of the United States twenty times over than the "Pinehurst Plantation," but this has been done not only by making the articles interesting, but also by buying much space in their advertising columns.—Yours truly,

P. B. LARKIN.

PARA RUBBER IN THE MALAYAN PENINSULA.

Resident General's Office, Selangor, Malay Peninsula, 24th Dec., 1902.

SIR,—I am directed by the Resident-General to enclose for your information one copy of a report on *Hevea Brasiliensis* in the Malay Peninsula, by Mr. Stanley Arden, Superintendent, Experimental Plantations, Federated Malay States.—I have the honour to be, Sir, your obedient servant.

O. W. H. COCHRANE,
for Secretary to the Resident-General, Federated Malay States.

[We are much obliged to the Resident-General for his attention. The importance of Mr. Arden's Report can be judged from his covering letter:—

Secretary to the Resident-General, Federated Malay States.

Batu Tiga, Selangor, 27th September, 1902.

Sir,—I have the honour to forward a report on *Hevea brasiliensis*, the tree furnishing the "Para" rubber of commerce.

2. The report deals with :—(*a*) A Short History of its Introduction into the East. (*b*) Cultivation. (*c*) Extraction of the Latex. (*d*) Yield. (*e*) Preparation of Marketable Rubber. (*f*) Cost of Opening and Maintaining a Plantation. (*g*) Probable Returns.

Many of these questions need much further investigation, work which is greatly handicapped owing to the very few trees at any disposal and the disparity in yield of trees growing under similar conditions, which necessitates the conduction of experiments over a large number of trees if reliable information is to be obtained.

3. The age at which tapping might profitably commence is still a matter of conjecture, but I have ventured the opinion that probably 50 per cent of five year old trees will give an average yield of eight ounces per tree, and that from 75 per cent of six year old trees an average yield of 12 ounces may be expected. Experimental tapping of young trees will be continued and the matter should be definitely settled within another eighteen months or two years.

4. The report on the rubber prepared by various methods will be made as soon as possible.—I have the honour to be, Sir, Your obedient servant,

STANLEY ARDEN, Superintendent, Experimental Plantations, Federated Malay States.

—ED. *T.A.*]

RUBBER AT 1,600 FEET ELEVATION.

Kepitigalla, Matale, Jan. 7.

DEAR SIR,—In reply to "Cha's"'s enquiry whether Para rubber would be profitable if grown at an elevation of 1 600 to 1,800 feet? I am now tapping some trees at about 1,600 feet on a hill side, and am very pleased with the excellent results obtained. Trees at this elevation, although a good deal smaller than the ones of the same age at a lower elevation, are now being proved to yield *better* than those lower down. They only require one incision in the morning and the cups are emptied at 11 a.m. and replaced under the same cut immediately, and are again emptied at 3 p.m., thus giving the same yield from one cut as would be obtained from two cuts on trees at the lower elevation. I have never been able to do this at the low elevation, as the latex does not flow after 10 a.m. This is proof positive that Para rubber yields better at 1,600 than at 600 feet.

I think this a very important fact, and one that will no doubt be noted by all concerned in Para. It is probably due to the cooler atmosphere at the higher elevation, which does not tend to coagulate the pure latex as it exudes from the wound. Whereas at the lower elevation the temperature being much higher, the latex scarcely has time to run into the cups before it coagulates on the way, owing to the heat.—Yours, &c.,

FRANCIS J. HOLLOWAY.

RAINFALL NEAR NAWALAPITIYA.

Donside, Nawalapitiya, Jan. 8.

SIR,—The following rainfall may be of interest to you, as also some of your readers, as there seems to be no register kept in this district by any of the Government officials :—1891, 194·88 inches ; 1892, 130·61 ; 1893, 124·95 ; 1894, 100·54 ; 1895, 130·19 ; 1896, 133·61 ; 1897, 131·51 ; 1898, 107·19 ; 1899 132·83 ; 1900, 149·26 ; 1901, 118·33 ; 1902, 126·31—Total 1,580·21 for the 12 years : an average of 131·68 inches.—Yours, &c., R. B. HECTOR.

[So that, strange to say, last year's rainfall—at Donside, close to Nawalapitiya—was below the average.—ED. *T.A.*]

BUTTER-MAKING.

Jan. 11.

Dear Sir,—To give that new style of butter-making a fair trial, I put about a pint of cream into the muslin and filtering paper: it took 3 or 4 hours for the moisture to trickle through and the butter was softer than if made by the old way viz., the cream put in a bowl and stirred with a spoon; by this method the butter was made in 5 minutes, as with this cold weather the cream is thick and firm and makes into butter very quickly and it is nice firm butter too, so that on the whole I like the old system best.—Yours truly, HOUSE-KEEPER.

P.S.—I'll give that butter-making yet another trial.—H.

COARSE PLUCKING: A WARNING FROM LONDON.

Kandy, Jan. 13.

Sir,—I enclose for publication the following telegram, received here today from London, which explains itself.—I am, Sir, yours faithfully,

A. PHILIP,

Secretary to the Planters' Association of Ceylon.

"Big London buyers recognise India means control quantities auction; spite strong statistic position, buyers confident able to keep down prices, because Ceylon resorting as before coarse plucking flood market: warn planters earnestly against coarse plucking. Ceylon Association."

THE LAKE-FLY NUISANCE: AN EXPERT REPLY TO THE "SEA-WATER" SUGGESTION.

Colombo Museum, Jan. 14.

Dear Sir,—Referring to Mr. Theobald's suggestion regarding the extermination of the Lake Fly, I have read his letter and may say that, as for the practicability of converting the Colombo Lake into a temporary arm of the sea, I have no doubt that this herculean method of purification would be child's play to an engineer—other things, of course, being equal. With regard to the question as to whether it would be likely to achieve the required object, it is necessary to know certain facts before an opinion based upon biological considerations could be hazarded, *e.g.*, the differences in density and salinity between the lake-water and the sea-water, the degree of salinity which could be endured for a longer or a shorter period with impunity, firstly by the larvæ and secondly by the eggs of the fly.—Yours faithfully, ARTHUR WILLEY.

THE LAKE-FLY NUISANCE.

Colombo, Jan. 14.

Dear Sir,—While thanking Mr. Willey for his reply to my letter in your columns *re* the "Lake Fly Nuisance" I fail to see that his remarks are in any way conclusive that my proposal is impracticable. The engineering difficulties appear to me the easier of the two, but we need not waste time discussing this till we know whether sea-water will exterminate the flies. On this point Mr. Willey is not definite. Perhaps, if he would kindly make a few experiments he would be able to give a decided opinion.—Yours faithfully,

F. C. THEOBALD.

COARSE PLUCKING AND RESPONSIBLE PARTIES.

Up-country, Jan. 16.

Sir,—You can put "Avoid Coarse Plucking" in a prominent place in every issue of your paper, but it will do little good unless the country is supported by the Colombo agents and certain V. A's., who, at present, are in that habit of jumping on their Superintendents for not keeping down the cost of plucking. If the Colombo agents would *insist* on their Superintendents spending say ½ cent per lb., *more* in 1903 than it cost to pluck in 1902, they would reap a penny profit for the ½ cent extra outlay. There are so few properties in private hands now, that the matters of supply and demand lie entirely in the hands of the Colombo agents. A Superintendent is not going to pluck "fine" or "medium" if it means the "sack" for exceeding his estimate for plucking. I have always maintained that since nearly all Ceylon tea estates fell into the hands of Companies, the Colombo agents have been the arbiters as far as yield is concerned. Mr. Figg apparently agrees with me.—Yours, &c., NORTH C. DAVIDSON.

PLANTING NOTES.

Notes on Plantain (Musa) Fibre Industry—by V T Vencatraman Aiyar, Valavanur South Arcot District—is a useful little pamphlet; but there is not much in addition to what we have already heard from Kew, Drs. Watt and Morris.

Java Cinchona Exports for 1902—are given at 13,143,000 Amsterdam lb. of bark as against 12,606,000 for 1901. In English lb. the comparison runs:—

1902	...	29,440,320
1901	...	28,237,440

The Amsterdam *pond* is equal to 2·24 English pounds—the French kilogramme being 2·20.

Rubber.—It is certainly quite time that the Chamber of Commerce added rubber to their list of exports since the one district of Kalutara is expected to give a crop of 7 tons or over 15,000 lb.; and this is bound to increase year by year as younger trees come into bearing. No doubt there are other districts, such as Matale which will contribute so that the youngest product in the list should make a brave show before long. From the Customs accounts for the first eleven months of 1902 we see that 161 cwt. (18,000 lb.) of rubber were exported, valued at R34,086.

COCOS ISLANDS.

Governor Sir F A Swettenham forwards to Mr Chamberlain a report by Mr. L H Clayton, District Officer, Christmas Island, who was deputed to pay the annual visit to the Cocos Islands. Sir Frank remarks:—"The report shows that the islands continue to prosper under the paternal rule of Mr. George Clunies-Ross and that the people are on the whole well-to-do and contented. There are no new developments which call for special remarks" Mr Clayton reports that the islands are still happy and contented, though they suffered severely from a cyclone in March, when the natives ran to lagoons and stood up to their necks in water, as the only place of safety. Existence at Cocos Islands is otherwise uneventful, but they now have a doctor, who is a great acquisition, for hitherto cases of illness have been diagnosed and treated by telegraph from Perth (Western Australia). The next great event will be the establishment of a Lloyd's signal station. The following is extracted from the report:—

I have nothing to add to what has been stated in former reports as to the excellent condition of the Cocos and Bantamese villages. The Cocos-born people are tidier and more attractive than the Bantamese, and, in the same way, the village of the former presents a better appearance, but in neither case did I see anything to call for adverse comment.

I visited Direction Island, a portion of which has been leased to the Eastern Extension Telegraph Company. There are resident there at present in temporary buildings Mr. Cameron and nine European assistants, with 14 Chinese servants and four Malay boatmen. In addition to these there are three Europeans and 39 Chinese engaged on the erection of permanent buildings for the staff. Eight or nine houses of various sizes will be required, and I should imagine it will be over a year before the staff are finally settled down. The chief difficulty that they have encountered has, I understand, been the lack of water. No water is obtainable on Direction Island, and at first they were supplied from the other islands by boat. A condenser has now been erected, and as the buildings are completed water will be collected from the roofs. The yearly rainfall is almost certainly over 80 inches.

In order to avoid the necessity of chartering ships to take the copra away, Mr Ross has recently purchased a sailing vessel, the "Broughton," a barque of 571 tons register. The only shipment of copra made in the past year was one of 706 tons sent to Europe by this vessel in May last. The quality of the Cocos copra appears to be as high as ever, as the shipment fetched the excellent price of £18 5s per ton, the highest figure reached for some years. There have been no other exports. About 190 tons of copra were in store ready for shipment, and I was told that 15 tons were produced in an average week's work.

The natives complain about their clothes. I share Mr Carter's opinion, in last year's report, that the difficulty of obtaining nice clothes is obviously not insuperable. A sailing race was also held for prizes given by Commander MacHutchin, and the winners had their choice of a piece of serge or a pair of substantial boots as prizes. The serge was chosen, as the men explained that boots were of no use except to dance in.

The ship went to North Keeling with Mr Ross on board. The island has only once been visited (1893) by a man-of-war, and in that year Mr Ross decided not to continue working it. No one had in consequence set foot there for nine years. Under the circumstances I was surprised to find that the undergrowth was not particularly thick, and that we had little difficulty in getting about. The house formerly occupied by Mr Ross was standing, although of course out of repair. The stock of food left in case of shipwreck had not been touched, and the well was in good order. Only slight damage had been done by the cyclone, and Mr Ross decided after inspection to work the island again in October. Every tree and bush is covered with the nests of frigate-birds, boobys, gannets, terns, &c. The birds are quite tame and have no fear of man. The white tern, to my mind the prettiest of all, is most inquisitive, and numbers of them kept fluttering round our heads. Mr Ross showed us one of the bird's egg *in situ*. It has been laid so as to rest between two ribs of a cocoa-nut leaf, and was so placed that the swaying of the leaf in the wind did not shake it off. There was no nest of any kind.

During my stay at the Cocos very few complaints were made to me, and those chiefly by the women. Poverty and the high prices charged at Mr. Ross's store were the principal grievances, but it did not seem to me there was much foundation for them. Mr. Ross told me that he had already detected among his people signs of restlessness owing to presence of the employés of the Telegraph Company. I cannot say, however, that I observed any indication of it.

The extraordinary influence exercised by Mr. Ross over the natives, and the wonderful success of his administration, made a great impression upon me, and I am confident that so long as the present proprietor retains his health there need be no fear that justice will not be fairly and evenly administered, or that welfare of the inhabitants will not be properly attended to. So long, moreover, as the conditions of life are as favourable as they are at present, I do not think that any complaint can be made if every legitimate inducement is held out to natives to remain there.—*London and China Express*, Dec. 5.

CEYLON TEA IN VIENNA.

We have received a copy of the illustrated "Wiener Bilder" of December 24th, which contains, beside Mr. Marinitsch's regular advertisement, nearly a page of illustrations devoted to "Tea Culture" with corresponding letter-press and a portrait of Mr. Marintisch—all of which is well calculated to interest readers in our staple industry and the product recommended to their notice.

The writer, who has gained his information while interviewing Mr. Marinitsch in his warehouse in Vienna, gives a full and interesting account of tea cultivation, packing, and exports. As the duty on tea in Austro-Hungary is double that levied in Germany, it must still be too dear to become the people's drink, which, he says, it ought to be throughout the Continent.

THE "THIRTY COMMITTEE."

Minutes of a meeting of the "Thirty Committee" held at the Victoria Commemoration Buildings, Kandy, on Saturday, 10th Janury, 1903. (7-30 a.m.). Present :—

Messrs A C Kingsford (Chairman); A Philip (Secretary); Hon. Mr J N Campbell, M.L.C.; Hon. Mr Edward Rosling, M L.C.; Hon. Mr Stanley Bois, M.L.C.; Messrs Gordon Pyper, Edgar Turner, James F Headrick, Hercules J Scott, W Shakspeare, Walter J Smith, C E Welldon, R Morison, W D Gibbon, G H Alston, H V Masefield, W Forsythe, Frank S Vowler, W D Bosanquet, T C Huxley, James Westland, Joseph Fraser, W R Tatham, R A Galton, Fred. Hadden and E Webb, (26 members.)

(After Formalities.) MISCELLANEOUS.— Read letter from Mr R V Webster regarding a new Tea Company for Switzerland. Read letters from the Co-operative Tea Gardens Company transmitting newspaper advertisements in Honolulu, America, Egypt, Malta, and Africa and sundry advertising matter in connection with Mr R V Webster's vote, for pushing and advertising Ceylon Tea. Read letter from Messrs Rodewald & Heath, Colombo. Submitted correspondence with Mr Charles Stonter. Read letter from Mr O H Greenslade and from Mr W Wilson Smith regarding selling of Tea in California, Mexico, Arizona and the Mining towns in the desert. "Resolved :—That the Committee regret being unable to entertain the applications."

TEA TRADE IN ANNAM.—Submitted correspondence with the Ceylon Chamber of Commerce.

MEMBERS OF COMMITTEE.—Read letter from Capt Gordon resigning his membership in the "Thirty Committee" in view of his departure from Ceylon.

CORRESPONDENCE, &C. CIRCULATED.

CEYLON TEA IN AMERICA.—Letters from Mr Mackenzie to Mr Kingsford, dated, Chicago, 27th October and Toronto 30th October ; Montreal 4th November New York 14th and 7th November ; to Mr Kingsford, Hampstead 5th December ; Mr P C Larkin to Secretary, Toronto 3rd November ; Mr R V Webster to Mr Kingsford, 4th December ; Mr P C Larkin to Mr Kingsford, Toronto, 20th November; Mr Mackenzie to Mr Kingsford, Hampstead 12th December, 1902.

COMMISSIONER ON THE CONTINENT OF EUROPE.—Letters from Mr Renton to Mr Kingsford, dated, 2nd November and Berlin 13th November Buckeburg, 27th and 30th November ; (2) 4th and 5th December.

CEYLON TEA (NEW MARKETS) FUND.—Letter to Secretary, from Government, dated, Colombo, 29th November, 1902.

PROPOSED INCREASE OF THE TEA CESS.—Letters received by the Ceylon Association in London in reply to Circular letter on the subject. Correspondence received from the Secretary, Ceylon Association in London, showing the opposition raised against the increase of the Tea Cess in 1901.—Submitted letters from Treasurer of the Colony.

CEYLON GREEN TEAS GRANT 1901-1902.—Memo. of payments made at 15th December, 1902. Amended Green Tea Memo. up to 15th December, 1902, in lieu of previous one with printers' error.

FINANCES.—Interim Sketch of Ceylon Tea (New Markets) Fund at 31, 12, 1902 subject to closing entries indicated.—Submitted Correspondence with National Bank of India.

CEYLON TEA IN AMERICA.—Letters from Mr Mackenzie to Mr Kingsford, dated, New York, 17th and 21st Oct., 1902.

COMMISSIONER ON THE CONTINENT.—Letters from Mr Renton to Mr Kingsford, dated, Stuttgart, October 10th, Lyons, 20th, Orleans, 24th, Paris, 26th, Paris, 28th, and Lyons, 17th 1902.

CEYLON OOLONG TEA.—The process in Formosa described, (printed.)

CEYLON TEA IN AFGHANISTAN.—Letters from Mr Foley to Mr Kingsford, dated, Quetta, 20th and 29th October and 13th and 29th Nov., 1902.

CEYLON TEA (NEW MARKETS FUND).—Memo. of Payments since July, 1902

CEYLON GREEN TEAS.—Statement of lb on which payment was made during 1901 and 1902.

CEYLON TEA (NEW MARKETS) FUND.—Submitted letters from the Treasurer of the Colony.

GOVERNOR IN EXECUTIVE COUNCIL.—Read letters from Government stating that His Excellency the Governor had been pleased with the advice of the Executive Council to sanction a further expenditure of R1,500, in presenting the Boer Prisoners-of-War who are returning to South Africa, with gifts of Ceylon Tea ; and to sanction the following proposed appropriations from the Ceylon Tea Fund of a sum of R470,000 :—

Green Teas, 7,000,000 lb. at 4 cts.	..	R280,000·00
America ..	.. ..	105,000·00
Continent of Europe ..	..	75,000·00
Administration Contingencies	..	10,000·00
		R470,000·00

CEYLON TEA IN AMERICA, REPRESENTATIVE IN AMERICA, WORLD'S FAIR, ST. LOUIS, U.S.A. IN 1904.—Submitted correspondence circulated. Read lettter from Mr Wm. Mackenzie, dated London, 19th December, 1902, in reference to Ceylon Green Teas. Resolved :—"That the extract from the New York correspondence be published in the newspapers."—Read letter and Memo of Instructions from the Chairman to the Hon. Mr William Henry Figg, representative in St. Louis, U.S.A. on a preliminary mission for report regarding the World's Fair there in 1904.

PROPOSED INCREASE OF THE TEA CESS.—Submitted correspondence and discussed the question. Resolved :—(I) "That it be publicly notified that the funds available are only capable of meeting the payment of a bonus at 4 cts. on 7,000,000 lb. spread over the year and that should larger quantities be made, say than an average of ⅝ million lb. per month, payment will have to be held over from time to time until funds are available (II) that the "Thirty Committee" considers Mr Rutherford's proposal to guarantee a bonus of 4 cents a lb. for 1903 payable partly out of 1904 funds is extremely inadvisable (III) that Proprietors at Home be again approached through the Ceylon Association in London and that it be represented that in view of the outturn of Green Tea during December, 1902 having been, say 700,000 lb. and the estimated manufacture for 1903 (submitted in detail), amounting to 12,000,000 lb., the Committee would again ask the Ceylon Association in London to consider the question of an increase of the Cess, and would push for an increase up to ½ a cent per lb. limited to eight months, 1st May to 31st December, 1903, thus providing funds for the payment of a further amount of, say, 5,000,000 lb. at 3 cents per lb.

Ceylon Tea in Afghanistan.—Read correspondence with Messrs Crosfield Lampard & Co. Submitted correspondence with Mr E G Foley.

Ceylon Tea in Honolulu and West Indies.—Read correspondence with Messrs Bosanquet & Co., and Mr R Valentine Webster, and intimated that the sum of R7,500, had been paid for credit of Mr R V Webster in full settlement of Grant voted to him in connection with pushing of Ceylon Tea in Honolulu, West Indies, North and South Africa.—The "Thirty Committee" then adjourned. A Philip.

Secretary to the Thirty Committee.

"THIRTY COMMITTEE ACCOUNTS, 1902.

	R c.	R c.
To Balance in Bank on Jan. 1st, 1902 ..	22,984 74	
,, Cash in hand on Jan. 1st 1902 ..	127 71	
,, Cess payments Jan.-June, 1902 ..	146,604 14	
,, Bank Interest ..	148 51	
By Expendiure Jan. to June, 1902		145,369 42
,, Balance in Bank on 30th June, 1902 ..		24,353 02
,, Cash in hand on 30th June, 1902 ...		142 66
	R169,865 10	R169 865 10
To Balance in Bank on July 1st, 1902 ..	24,353 00	
,, Cash in hand on July 1st, 1902 ...	142 66	
,, Cess payments July-Dec., 1902 ..	227,846 51	
,, Bank Interest ..	162 77	
By Expenditure July-Dec., 1902 ...		236,457 43
,, Balance in Bank on 31st Dec., 1902 ...		15,830 02
,, Cash in hand on 31st Dec., 1902 ..		217 51
	R252,504 96	R252,504 96

CESS PAYMENTS, 1902.

	R c.			R c.
January	21,324 57	..	July	46,312 69
February	25,783 70	..	August	51,365 53
March	21,249 03	..	September	39,184 49
April	20 677 02	..	October	33,397 77
May	30,284 45	...	November	29,152 62
June	27,285 37	..	December	28,433 41
Total ..	R146,604 14		Total..	R227,846 51

EXPENDITURE, 1902.

	Jan. June. R c.	July-Dec. R c.	Total. R c.
Continent of Europe	30,120 25	37,529 35	67,649 60
Russia	—	2,273 69	2,273 69
America	30,041 05	45,058 70	75 099 75
Green Tea Bonus	73,685 20	128,677 40	202,362 60
South Africa and West Indies	—	7,500 00	7,500 00
Afghanistan	5,779 27	1,403 04	7,182 31
Boer Prisoners-of-War	—	9,408 50	9,408 50
Golden Tips	249 00	—	249 00
Salaries and sundries	5,494 65	4,505 35	10,000 00
St. Louis Exhibition	—	101 40	101 40
	R145,369 42	236,457 43	381,826 85

DETAILS OF EXPENDITURE.

Continent of Europe: R67,649·60—being cost of £4 500 remitted Mr Renton, details of this expenditure will be shown later in Mr Renton's account.

Russia: R2,273·69.—Amount paid Messrs. Crosfield Lampard & Co. being balance of £1,000 voted them in 1898 for pushing Ceylon tea in Russia. Against this vote of £1,000 Messrs. Crosfield Lampard & Co. show shipments of 5 million pounds during the three years.

America. R75,099·75—being cost of £5,000 remitted Mr. Mackenzie, details of this expenditure will be shown later in Mr. Mackenzie's account.

Green Tea Bonus: R202,362·60

	R c.
Claim on account, 1901. 18,183 lb. at $1\frac{1}{2}$ cts.	272 24
Being bonus on 36,995 lb. at $6\frac{1}{2}$ cts.	2,404 66
137,863 lb. at 6 cts.	8,271 78
151,883 lb. at $5\frac{1}{2}$ cts.	8,353 52
3,661,198 lb. at 5 cts.	183,059 90
3,987,939 lb.	R202,362 60

Total..	3,987,939 lb.	1902
	1,590,000 lb.	1901
	472,294 lb.	1900
	86,327 lb.	1899
	13,302 lb.	1898

6,149,862 lb. to date 31st December, 1902, on which a bonus has been paid. Amount remaining of 5 cents bonus, R7,454·83 for 149,095 lb.

South Africa and West Indies, R7,500—being grant of £500 voted Mr. R V Webster in 1900 for pushing Ceylon tea in North and South Africa, Honolulu, the West Indies, Malta and Gibraltar.

Afghanistan, R7,182·31—No. 2 account received from Mr. Foley R3,000.

	R c.
Despatched 120 half-chests Green Tea costing	2,846 01
Telegram to Quetta...	3 60
Amount at credit transferred to No. 1 account	150 39
No. 1 Account.—Paid Mr Foley for report on the Bombay Tea Trade	500 00
Green Tea samples sent to Sir Acquin Martin	53 00
Fancy Boxes Green Tea sent to the Ameer	29 20
One half-chest Ceylon made Namouna ...	25 20
Paid Mr. Foley	1,000 00
Paid Mr. Foley, Telegraphic remittance	1,012 20
Cost of 8,061 lb. Tea sent Mr. Foley and Freight	3,159 67
Cost of 3,300 lb. Tea sent Mr. Foley and Freight	1,288 19
Paid Messrs. McIver Mackenzie & Co... (Being Duty, landing and forwarding charges about R690 less proceeds of damaged tea)	265 24
Total ..	R7,332 70
Less amount at credit No. 2 account..	150 39
Total outstanding ...	R7,182 31

Of this amount about R5,000 is recoverable from Mr. Foley.

Total amount of tea shipped Mr. Foley about 14,500 lb

Boer Prisoners-of-War.—R9,408 50—being the cost of 4,585, five pound boxes of tea presented to all prisoners-of-war returning to South Africa. Total amount of tea 22,925 lb. costing with boxes 41·04 cents per lb. This tea was distributed before landing in South Africa and was allowed into the country free of duty.

"Golden Tips" R249.—Cost of 50 copies of "Golden Tips" sent to Mr. Mackenzie for distribution in America.

Salaries and Sundries, R10,000,

SIX MONTHS ENDING 30TH JUNE, 1982.

Auditor	R65	00c.
Printing, etc. Book of Proceedings ...	667	80
Miscellaneous (Cyclostyle services) ...	300	00
Ceylon Association in London ..	450	00
Secretariat and Management, A Philip & Co., Contribution to Office Expenses	1,500	00
Peons' Services	168	00
Postages, Petties, &c.	217	05
Charges	107	50
Printing, Advertising, &c. (Capper & Sons)	132	12
Secretariat and Management Secretary	1,500	00
Stationery Account	315	74
Telegrams	71	44
	R5,494	65

SIX MONTHS ENDING 31ST DECEMBER, 1902.

Auditor		R 65·00
Miscellaneous as under :—		
Mr Kingsford	R250·00	
Mr Philip ..	125.00	
Walker's ...	15·00	
Cyclostyle ...	300·00	690·00
Messrs A Philip & Co.		1,500·00
Peons' Services, ...		163·00
Postages, Petties &c.		101·05
Charges as under :—		
Cheque books	R 10·00	
Coolies ...	105·00	
Brown and Davidson ...	102 50	
Railway Freight ..	1·10	218·60
Printing advertising, &c. as under :—		
Capper & Sons	R 46 43	
Apothecaries Co., Limited	105·85	
Ceylon Independent ...	60·25	
H W Cave & Co. ...	33 05	
Kandy Industrial School ..	17 12	262·70
Secretary		1,500·00
		R4,505·35

First six Months in 1902	R5,494 65
Second do do	4 505·35
	R10,000 00

ST. LOUIS-EXHIBITION R101·40—being cost of Telegrams to Mr Figg.

GREEN TEA AND PATENTS.

Writing under date, 7th January, Mr Drummond-Deane mentions :—"My Ceylon patent for the Deane-Judge Strainer hangs fire owing to the usual red-tape, though it has been granted long ago for India. I am of opinion that the 'Thirty Committee' bonus on green teas should be on a sliding scale; otherwise, as black teas rise in value, greens will fall back. I suggest as worthy of consideration that with black tea average 8d or over, the green tea bonus should be not less than 8 cents which, with such an average, the black tea producers can well afford and that for every farthing fall (or fraction of a farthing) there should be ½ a cent reduction down to 6d average, where it should remain at *4 cents*. Something on these lines is wanted if you don't want to nip the green tea industry in the bud. We shall shortly have a Deane-Judge Finishing and Pan-firing Machine for the Ceylon public."

Mr. Drummond-Deane will see that we cannot go on even at 4 cents and that there are many who think green tea could stand by itself, so good have been the prices paid at Colombo sales lately. What does our correspondent think of 36 cents for low-country greens apart from bonus? But the question is now pertinently asked as to whether the fostering of a *new industry* is not peculiarly the duty of the Government.

TEA CULTIVATION IN THE CAUCASUS ASIATIC RUSSIA.

With reference to the notice on pp. 368-9 of the *Board of Trade Journal* for 15th November, 1900, H M Consul at Batoum, in his recent report, states that the cultivation of the tea plant in the Southern Trans-Caucasus, and principally in the vicinity of Batoum, is making great strides. It is only some nine years since the first attempts in the culture of tea were made on the coast of the Black Sea by a Russian gentleman, and his undertaking was then looked upon most sceptically by the majority of the agricultural people in the district. Since then it has, however, become evident that tea can be cultivated to advantage, and several other persons in the district also began to grow tea on their estates, among them the managers of the Imperial Domains, who now have 500 to 600 acres under tea.

During the present year the tea crop surpassed all expectations, 1 dessiatine (2·7 acres) having, on an average, yielded 20 pouds, or 800 Russian lb (720 lb avoir. weight), which, at the rate of 1 rouble per pound, the all-round wholesale price at which it has been sold, has brought in 800 roubles per dessiatine; or, as near as possible, 30*l* per acre.

Owing to the satisfactory results obtained during the period, under review, the Russian Ministry of Agriculture, it is understood, is about to adopt a series of measures in order to encourage and foster the cultivation of tea by the small peasant classes, and books containing instructions and explanations with regard to the industry, are being widely circulated among the farmers of the locality in which the tea is grown.

Under the conditions set forth above, the theory that tea growing in the Caucasus would not be generally adopted on account of the unfavourable climatic conditions and other difficulties which have to be encountered, including the high rate of wage paid for labour, or that the tea industry and trade of the Caucasus could not possibly expand to a stage which would render it, even at a remote date, of commercial importance, is apparently an exploded idea. The results obtained during this season show that quite the contrary is likely to be the case, and that there is every reason to believe that the cultivation and manufacture of tea promises to be one of the most prosperous and profitable agricultural pursuits in the Trans-Caucasus.—*Board of Trade Journal,* Dec. 24.

TEA TRADE CHARGES.

The recent regrettable failure of an old and honourable City firm of tea merchants, who attributed their losses chiefly to the changing conditions of their business, has directed attention to the almost complete revolution that has taken place in the tea trade of late years. So far as the retail buyers are concerned, it has come about so silently and gently that they have fallen in with it, quite unconscious that any transformations were proceeding. They are vaguely aware that China tea has to all intents and purposes passed out of their grocer's shop, and they are learning that tea should be drunk when freshly made. Price remains their chief standard of comparison, and the average householder feels she has acted rightly when she orders a quantity at 2s. a

pound for general use, and a smaller amount at 2s. 6d. for her weekly "At Home" day. But how it has come about that month after month she can rely upon having the same quality of tea, and

THE SAME "ROBUST" OR "SOFT" FLAVOUR,

to cite the terms of the dealer's list, she knows not, nor has she any idea of the skill and science which have ousted the rough and ready methods of by-gone days. The old-fashioned tea-caddy, with its divisions for black and green tea, which were mixed at the discretion of the lady of the house, seems as far from the elaborate machinery of scientific blending of today as the tallow candle from the electric light.

To understand the present conditions of a trade of such vast proportions and Imperial moment, it is necessary to go back to the early sixties, when the experiment of tea-growing were first made in India China was then supplying the world, or rather, such portions of it as consumed tea, and gentlemen of long experience in the trade can tell one that about 1868 the general quality of this tea was at its best, though 1879 saw the "record" of bulk ever furnished by the Celestial Empire. Meantime, it was steadily deteriorating, however, and India was becoming a more and more formidable rival. Ceylon came into the lists, too, and by 1886 was sending in 6,000,000 lb, and every year has made enormous strides. It is interesting to note, therefore, the

RELATIVE PROPORTIONS OF THE TEA

now drunk in this country by the figures of last year. Roundly, India furnished us with 148,000,000 lb, Ceylon with 91.000,000 lb, and China with 10 000,000. According to the latest available statistics, India has nearly 525,000 acres now under tea cultivation, and Ceylon 387,000. Tea is a growth that is most easily affected by soil, height, the wetness or dryness of a season, and a score of other influences, and the products of certain estates are known to be superior to those of others. With the varying conditions of such a wide area, and tea good, bad, and indifferent available, how is it that it reaches the consumer so unvarying in the standard of quality and flavour?

It is due entirely to the expert ability of the blender and when new methods were introduced about 1888, the transforming change began. Previous to that the grocer, judging approximately the amount he would required, ordered a few chests of China and Assam tea of varying degrees of pungency or mildness, and according to his own judgment mixed any two or three of them, and gave them labels and designations as he thought most likely to commend them. He did not possess the super-cultivated palate

ESSENTIAL TO A TEA-TASTER;

his ideas of combinations were essentially primitive and restricted, and he quite failed to take into account that, say, the Orange Pekoe from Darjeeling, which had been so good a feature of "our strongly recommended" last year, might this season be a totally different tea, on account of an abnormal season. Of course, his mixtures sometimes proved successful, but there was always uncertainty, and the fastidious people who were wont to say, "they could not drink grocers' tea" were in the habit of sending to one or other of the old fashioned London houses, which made a speciality of high priced and choice teas.

The pioneers of the change conceived the bold idea of supplying the grocers with ready-blended tea, and bold and enterprising firms pushed forward the scheme with rapid success. They secured the assistance of tasters able to detect the subtlest gradations of flavour, and able to judge to a nicety the exact degree to which a full, rough Assam, with its large precentage of theine, should be tempered with the softer growth of Ceylon's uplands, and the fragrant dash of some scented variety. By means of constant experiment they mastered the great secret, which is to produce a "negative" blend.

IN A POPULAR TEA,

at the present time there may be anything from twelve to twenty different kinds of the leaf, each representing some different qualification of strength, delicacy, flavour, or aroma. The importance of the water used is now recognised as it never was of yore, and different blends are prepared for districts where this can be broadly classed as hard or soft. In the mixtures prepared for Scotland and Ireland, for instance, the combinations are quite distinct, But between these clearly defined divergences there are endless lesser ones and it is found on experience that a blend embodying numerous constituents is more likely to prove universally suitable and palatable than one into which fewer varieties enter. Moreover, in the event of a failure in any of the crops represented, it is easier to replace a small proportion of the whole, and to maintain the level standard that the public now demands in what may be termed the "branded" teas of favourite firms.

It is pleasant to be able to state, on the highest authority of the wholesale houses, that never has better value been offered to the retail buyer than at the present time. The prices both of Indian and Ceylon teas have been steadily declining during the last twenty years, and adulteration has thus been stamped out. So much genuine, even if not high-class, tea is now available, that there has ceased to be the incentive there once was to mix other items with it, so that though flavour of the cheaper descriptions sold may not always appeal to a critical and fastidious tastes in tea, there is no occasion to fear it may contain foreign substances. The average housekeeper, too, has learnt to make tea upon better principles, and instead of extracting every grain of tannin it contains by long infusion, she uses more of the leaf and pours it out after two or three minutes' "drawing," to the advantage of the nerves and digestion of the consumer. This point is illustrated to some extent by the steady growth of the tea drunk per head of the population, which from the 4.91 lb of 1895 had attained last year to 6.17 lb., and is beginning to approach Australia—the greatest tea-drinking country of the world in ratio to its population—with its 7.80 lb.—*Daily Telegraph.*

SEYCHELLES VANILLA.

The Administrator of the Seychelles, in the course of his annual report on the trade for 1901, states that the falling off in the value of exports of coconuts, coconut oil and soap is attributable to neglect of existing plantations in favour of the cultivation of vanilla. Admirably suited as are the climate and soil of Mahé, Praslin, La Digue, Silhouette, and many other islands for the cultivation of this valuable orchid, the abandonment, or even partial neglect, of coconut-plantations is much to be deplored. In view of the many uses to which coconuts can be put, the danger of over-production is slight; but in the case of vanilla, the danger of over-production is considerable. There is capriciousness about the yield of vanilla, and even a greater capriciousness about its price, which renders it desirable that planters should have some other products of economic value to rely on when the yield is small or its selling-price unremunerative. This conclusion seems to be justified by the following statement, showing the quantity of vanilla exported from Seychelles and its declared value at the Customs from 1891 to 1901:—

	Quantity in Kilos.	Declared Value. Rs.
1891	40,929	373.190
1892	28,177	394 478
1893	28 869	346,428
1894	24 444	293.328
1895	4,553	60,344
1896	31,227	936,000
1897	30,691	920,730
1898	25,177	748.810
1899	41.835	1,338,720
1900	17,569	580,877
1901	71,899	1,108,792

Nearly the same amount of vanilla was exported in 1891 as in 1899, and yet the declared value of the vanilla of 1899 exceeded the declared value of the vanilla of 1891 by almost 1,000,000r. In 1901 the quantity of vanilla exported exceeded four times the quantity exported in 1900, and had prices been maintained, the declared value of the vanilla exported should have been over 2,000,000r., or four times what it was in 1900; but it will be seen that it was not quite twice as much, and, as has been pointed out before, the declared value probably exceeded the actual value.

The first year for which there is any record of vanlla being exported from Seychelles is 1877, and in this year the quantity was 60 kilos., valued at 1,195r. The next year the quantity exported rose to 147 kilos., valued at 2,950r., but fell in 1879 to 8 kilos., valued at 160r. In 1880 the export of vanilla amounted to 1,713 kilos., valued at 22,877r., and from that year Seychelles has never looked back as a vanilla-producing country. —*Chemist and Druggist*, Dec. 27.

THE BRAZILIAN RUBBER CROP.

DEVELOPMENT OF THE GUTTA PERCHA INDUSTRY.

In a report on the prospects of the Brazilian rubber trade the United States Consul at Para says the political troubles in the Acre territory have had a serious effect upon the rubber trade throughout that region, and will undoubtedly result in largely reducing the crop. The rubber produced on the Beni and the Acre is considered the best that comes to Para, and its loss will therefore be felt by shippers and importers alike.

It is said that the caoutchouc forests of Peru, from which nearly the whole supply of this product has heretofore been drawn, are practically exhausted, as the result of the wasteful methods persued by the gatherers. It appears, however, that there is an almost inexhaustible supply of caoutchouc in the little-known regions about the Upper Madeira. In the near future,

GATHERERS MUST LOOK TO BOLIVIA

for their supply of this gum. It is understood that a strong effort will be made to prevent their destroying the trees as in Peru. Experts state that the tree can be tapped in a special manner and its gum extracted year by year for a long term before it becomes exhausted.

A serious obstacle to the successful production of rubber on the head waters of the Madeira is the system of taxation now in effect. Rubber merchants are charged 23 per cent ad valorem export duty by the State of Matto Graoso. The State of Amazonas also charges 23 per cent duty.

GUTTA PERCHA.

The supply of balata in sight is said to be so great that no fears of a shortage need be entertained for years to come, if the business is properly and intelligently handled. Experts report that there is not a tributary to the Amazon which does not show forests of this tree upon its banks. The importance of this new industry in Brazil may be realised when it is known that the market price of balata is equal to that of the best rubber and the cost of production is less than one-tenth that of rubber.

BALATA HAS ANOTHER ADVANTAGE

in that it does not necessitate the risk of life attendant upon the gathering of rubber. The balata grows upon high ground, as well as on the margins of the swampy streams where the fevers lurk. It is a common saying in Para that every ton of rubber from the upper river costs two lives. This can never be said of balata, for men may work at this industry with no greater risk than usually attends any labour in the Tropics; and four men will gather as many kilograms of balata per day as thirty men can obtain of boracha.

At present there are three syndicates in the field to produce gutta-percha, one English, one Belgian and one German.—*Commercial Intelligence*, Dec. 25.

MASKELIYA PLANTERS' ASSOCIATION.

THE ANNUAL REPORT.

The CHAIRMAN—after the notice calling the meeting was read, asked the Secretary to read the annual report.

Mr H A WEBB—Hon.-Secretary, read the report as follows:—

Your Committee begs to submit to you its 31st annual report.

Four General and four Committee Meetings were held, at which the attendance as usual was good.

MEMBERSHIP.—The number of estates subscribing to the Association, is 54 against 52.

FINANCES.—The balance at credit of the Association is R742·11 as compared with R705·10 in 1901.

CROP ESTIMATE for 1903 is:—Black Tea, 7,486,000 Green Tea, 350,000.—Total 7,836,000 against an estimate for 1902 of 8,000,000.

TOTAL ACREAGE in tea on the district is 18,096. Estimated yield in this is at the rate of 440 lb per acre.

SEASON.—The very bad flushing weather of the last half of the year has caused a great shrinkage on the out-put of the district and on many cases estimates will not be reached. This was not so much due to incessant rainfall as to the long-continued, cloudy, cold weather and the great want of sun. Prices have generally been rather lower.

LABOUR has been sufficient for the needs of the district, probably owing to the shortage in the crop before-mentioned.

UPCOT-GLENUGIE CART ROAD.—This subject, which has occupied the attention of the Association for a long time past, seems at last, in a fair way to be settled. For this the thanks of the Association are largely due to Messrs Craib and Cuff who have taken much trouble in the matter.

TRAVELLERS ROADS.—The following grants were made:—Hapugastenne Road, R100, Stockholm Road R60, Nyanza Road, R40, Glenugie Road, R50, Balangoda Road R30, Browulow Road R10, Emelina-Brunswick Road, R25.—Total R315.

PLANTERS' RIFLE CORPS.—This continues to be well-supported in the district and great interest is shown both at drills and on the two ranges.

REGISTER OF ESTATES.—The Tin Ticket system has been working on the whole fairly well during the year and promises to be of assistance to planters. There have been a few complaints about minor details connected with it; but it is only natural that slight irregularities should occur at the inception of such a scheme, and they are being rectified as attention is called to them.

CEYLON NURSING ASSOCIATION.—This Association took the initiative in bringing the claims of the C. N. A. more prominently before the Planting Community, and it is hoped that much benefit to the Funds will result.

W. A. BRAYBROOKE,
H. A. WEBB,
GEO. GREIG.

The report was received with applause.

CALIFORNIAN ORANGES IN LONDON.—Mr. Thos. Christy, F.L.S., reports by a recent mail:—

You will, perhaps, be surprised to learn that the Navel Orange, which grows near California, is being sent to England this year in small boxes, most carefully packed, and the price in the market is 6d each—small ones 4d each. It, certainly, is a very fine orange. Those that have come in front Jamaica sell at 2d each, taking a whole case. They certainly are well packed and have arrived here in fine order.

OUR COCONUT PRODUCTS IN 1902.

The tabular statements which we issued as a *Supplement* to all our subscribers last month, shew that the Coconut Products of the Island have had another good year as regards volume. In prices, too, 1902 has been a satisfactory year, although for the latter half of it they compare unfavourably with those which ruled during the last few months of 1901, when Copra ranged between R55 and R62·75 per candy—select parcels fetching even R65 and R66—against R52·50, which has been the top price for about three or four months past. But Coconut Oil in 1901 ran up from R375 on 1st October to R437·50 on 31st December, while last year it fluctuated but little between R370 and R380. Hence 1903 has not opened as brightly for the products of our most useful and valuable palm as the previous year which, however, was in many ways an exceptional one.

Turning to our tables it will be seen that the quantity of Coconut Oil exported—512,498 cwt.—was the largest during the decade; but it was exceeded eleven years ago (in 1892) when 550,977 cwt. were shipped. That figure has never been realised since; but the quantity of Copra exported in 1892 was little more than one-third of that for last year, and Desiccated Nut less than one-fourth. Most of our Oil in 1902 went to the United Kingdom—as, indeed, it generally does—save, we believe in 1897 and 1898 when India displaced the mother-country. But whereas the United Kingdom was responsible for 301,647 cwt. last year, or about three-fifths of the total export, India took only 64,370 cwt. or less than one-half of the quantity she had in 1901. Can any of our expert readers enlighten us as to the causes of the heavy falling-off, and the curious shifting of trade in the two years we have specially named? America takes second place with 92,996—a bigger leap from 27,205 cwt. in 1901, than India, which has third place, has taken backwards. Austria, with 24,774 cwt. comes next—being the only other country with more than 20,000 cwt. to its credit.

In Copra, the mother-country takes a decidedly back-place, having had only 12,908 cwt., out of 374,796 cwt. exported. Germany takes the lead, having displaced France which used at one time to lead, with 179,819 cwt. against 110,144 cwt. for France, Russia making a bad third with 33,136 cwt., and Belgium and Austria coming next. The United Kingdom may be said to be at the bottom of the list, as Holland with 476 cwt. and India with only 5 cwt. can scarcely count. If, therefore, the claim put forward on behalf of England, that she makes more Coconut butter than the Continental countries which are advertising it so largely, the manufacture must be direct from the Oil, and not from the raw material which France and Germany probably specially value for the residuum of poonac as food for stock. But notwithstanding the high prices which prevailed, and the large contracts of which we heard a good deal early in the year, the total quantity of Copra exported is disappointing, having been only 374,796 cwt. against 439,865 cwt. in 1901, and 506,277 cwt. in 1898—the record year for Copra, as 1892 is for Oil. In Desiccated Coconut, however, 1902, with over 16¼ million lb. sent away, stands *facile princeps*, the quantity exported the previous year having been about 2¼ million lb. less. The industry, as our readers are aware, is a comparatively new one, having found a place in our export tables for the first time only in 1891, with but 416,330 lb. Its steady growth without any fluctuation, save for a small one in 1893-94, is evidence that the industry is on a sound footing, and that there is no accumulation of stocks, and no out-running of the supply over the demand. As a rule, we believe, the outturn is regulated by orders; and the gradual development is proof that the manufacture is growing in popularity for confectionery. The United Kingdom is here, again, our best customer, with nearly 10 million lb. to its credit, America coming next with 2,249,143 lb., and Germany showing kinship with both countries with 2,067,490 lb., followed by Australia with 795,050 lb.! Another hopeful future about the industry is that it is exported to thirteen out of the nineteen countries which find a place in our export tables, while Copra finds a market only in eight, at any rate in direct shipments.

In Coconuts in the shell again, the year is a disappointing one with about 12½ million nuts against nearly 15 millions in each of the two previous years, and considerably over 13½ millions in 1897 and 1898. As in Oil and in the Desiccated kernel, the mother-country comes first, having taken over three-fourths of the outturn. Africa, curiously, is the next best customer with 1,375,621 and Germany the next with 1,169,780. The nine other customers which follow have been content with much less than quarter-a-million nuts each. We cannot say that we regard with satisfaction the fact that 1902 is the record year for Poonac, with 247,697 cwt. sent away, since the cattle of the Island are not particularly well-fed, and they would be all the better of getting, as food, the refuse of all the Oil expressed in the Island. But as there is little chance of the village cattle being allowed the luxury, we cannot complain of buyers being found in Belgium and Germany, which are practically our only two customers for all the Poonac we do not use ourselves, save 200 cwt. which is distributed among four other countries. The exports of Coir, in the shape of Yarn, Rope and Fibre, call for no special remark—the quantities having been only fair average ones; but prices have ruled fairly high, and there is practically an unlimited quantity of Coir available, if only the demand grows. As it is, Singapore takes almost all our Rope—over 15,000 cwt., leaving less than 300 cwt. for four other countries. The United Kingdom is again our largest customer for Fibre and Yarn. Who will say, after this, that there is not room for the expansion of trade in low-country products in America—the way for which can be shown at the Louisiana Exposition.

HONEY AND WAX IN MADRAS FORESTS.

(*From a Correspondent.*)

Amongst the various items of minor forest produce, by no means the latest important of those collected in the Sattyamangalam Hills of the Coimbatore District are honey and wax, of which there are

THREE SORTS,

found in different places and made by different kinds of bees. These are :—(1) Rock honey, made by very large bees, and found in holes and under ledges of rocks—this honey is coarse and dark, and the wax very dark-coloured and very large-celled ; (2) honey made by smaller bees, and found in the hollows of rotten trees—the honey and wax are both lighter than those found on the rocks ; and (3) honey made by very small bees, and found on the branches of trees—this is the best honey and the finest, whitest wax, much resembling the English heather honey, but with smaller cells. Of the rock honey, the average number of combs found on each rock is from 10 to 15, which give altogether about 150 measures of honey and 10 maunds of wax. These take about 10 or 12 days to collect, and for this amount the collectors are paid Rs 50 to Rs 80, and it brings in some Rs 240 to Government. From the hollows of trees the largest combs afford about one measure of honey and 2lbs of wax, while from branches the largest give only about a quarter measure of honey and less than half a pound of wax. Sometimes the rock honey is very poisonous, due to the bees gathering from the flowers of the *Thorova* (believed to be *Sapium indicum*). A few of these flowers (easily recognisable) are always deposited in some of the cells, and the honey is always bitter in taste. Ordinarily, the bees gather from the flowers of *Vengai Nagai Cassia Fistula Shorea Albizzia*, Jasmine, &c. ; they build over and over again on the same spots on the rocks, and the number of combs varies very little, depending on the number of flowers available, two or three, more or less, than the average number of combs being the most. The young bees from undisturbed combs take flight with the queens to other localities, and form fresh colonies.

THE BEES HAVE TWO WORKING SEASONS

in the year viz., June and July—this honey is collected in August when the rocks are dry ; and September, October, and November—this honey being collected as soon as the hot dry weather set in. The collection of rock honey is always done when the rocks are dry and the chance of slipping are less. In the Sattyamangalam Hills the collection is done only by Kurumbers, and their method of collecting is a curious one. A party consisting of never less than 10 men, sometimes as many as 15, is formed. Of these, two only are the collectors (Knrumbers), the rest, who may be either Sholigars, Uralis or others, are taken by the Kurumbers to carry their goods and chattels, erect sheds, light fires, and also to be company for them in the forests. The two Kurumbers are always brothers-in-law, that is to say, each man's wife is the sister of the other man. (The reason for this is that one of them is, for the time being, responsible for the life of the other; if the rope were not held very firmly, or were allowed to slip, the man on the ladder would be dashed to pieces against the rock, and so his wife (sister of the other) would become a widow, to the lasting shame of her brother who was responsible for the catastrophe.) The expedition always starts on a Monday, which amongst these hill tribes is the auspicious day. On the eve of the start, the elder Kurumber and his wife invite the other Kurumber and his wife to their house to partake of a meal with them, after which each woman warns her husband and brother of the dangers which lie before them and of the precautions each must take in guarding the other during the collection of the honey. This done, the men and women take leave of each other, and this occasion of the farewell meal is the only time during which the

HONEY COLLECTORS

may see their wives for three days before setting out ; should they violate this rule, they believe that they will most assuredly be badly stung, and two or three of the Kurumbers solemnly declare they have been stung, but *only* in such circumstances. When starting off on the Monday morning, the party take with them coconuts, plantains, camphor, etc., as offerings to their deity, also their implements of collection, which consist of a long ladder (*malkunni*) made of *karacha* (*Hardwickia binata*) with a stout rope made of the same material attached to it, a bowl made of basket work covered with mud, with a long handle, in shape much resembling a soup ladle, a sharp pointed stick, and a bundle of torches made of green and dried grass mixed. Having arrived at the scene of action, they look about for a large firm tree, and, having found one, make *puja* and offerings to it. They then fasten the rope attached to the ladder firmly round the tree and dangle the ladder over the edge of the rock and one of the Kurumbers holds on to it while the other, having offered more *puja* to his deity for his safety, climbs down the ladder until he finds himself on a level with the honeycombs. Arrived there, he plants his right foot firmly on one rung of the ladder, leans his left knee on the rung above and puts his head through the next two above, thereby securing himself, and leaving his hands free. Being firmly fixed he swings himself backwards and forwards, having in one hand a burning torch, and in the other the pointed stick, and as he swings in towards the rock he applies the torch to the combs, and by repeating this many times he succeeds in driving out the bees. Having got rid of them, he next drives the pointed end of his stick into the comb, and as soon as the honey begins to flow he calls out for the bowl, which is lowered from above by means of a rope, and hangs it under the comb until it is full. It is then drawn up again and the contents emptied into a chatty at the top of the rock. The bowl is then sent down again, and the process repeated until all the honey is extracted, and then the wax is removed by hand from the rock. The whole time the man is swinging backwards and forwards in his rope ladder he utters *manthrams* to keep off the bees and to prevent himself from being stung. At the end of each day's work he climbs up on to the top of the rock, and again

MAKES PUJA FOR HAVING BEEN KEPT IN SAFETY,

and on the last day, when all the honey and wax have been collected, the two Kurumbers untie the rope from the tree, and drop the ladder down to the bottom of the rock, uttering, as it falls, words which mean "My mother comes down." They then make their way down to the bottom of the rock as best they can, taking with them three leaves full of the honey. They prostrate themselves on the rock and offer the honey to

their deity as a thank-offering for their safety. This over, they roll up the ladder and proceed homewards, and the end of the expedition is a ot bath.

In the Sattayamagalam Hills there are four sects amongst the Kurumbers. (1) *Hal* Kurumbers, who are field labourers, and magicians; (2) *Mulu* Kurumbers, a nomadic tribe, also magicians; (3) *Kuri* Kurumbers, sheep shearers, and wool weavers, and (4) *Andai* Kurumbers, bamboo workers. Of these only the two first are collectors of honey. and each pair of brothers-in-law keeps entirely to his own beat, so much so that those of one beat do not even know those of the next, even though living in adjacent villages, often less than 20 miles apart. There is no inter-marriage between any of the sects.—*M. Mail*, Jan. 7.

BRITISH CENTRAL AFRICA.

N. E. RHODESIA CLOSED TO THE RUBBER TRADE; COFFEE SUFFERING FROM DROUGHT.

Blantyre, Dec. 31.

The Chartered Company has proclaimed the whole of North-Eastern Rhodesia closed to the rubber trade from January 1, 1903.

The officials of the Chartered Company are vigorously enforcing the new game laws. Consequently settlers residing near German territory are taking out licences to shoot there.

Glowing accounts have been received of the Harrison Expedition to the Victoria Nyanza. These reports state with regard to the Mombasa route to Lake Tanganyika that goods can be brought there in three months' less time than by the Zambesi route.—London *Times*, Jan. 1.

Blantyre, Dec. 30.—The long continued drought in the Shire highlands has wrought havoc with the coffee plantations, many of which, being of recent growth, will probably be destroyed. The native food crops are also backward in many districts, and if there is no rain it is feared that there will be a famine.—London *Times*, Dec. 31.

GOW, WILSON AND STANTON'S INDIAN, CEYLON, AND JAVA **TEA** REPORT FOR 1902.

13, Rood Lane, London, E.C., Dec. 31, 1902.

The tea industry has been passing through a series of years showing unsatisfactory results to producers, and 1902 proved perhaps worse than any of its predecessors. The year opened with the most gloomy forebodings, the market being overweighted through surplus production, while it was generally anticipated that the output in 1902 would be even larger, and that prices in consequence would show a further fall. This cloud hanging over the market not only prevented a rise in prices throughout almost the whole year, but resulted in the lowest average ever recorded, that for Indian tea being for many months about a penny below the excessively poor rates of 1901;—perhaps lower than would have been warranted even had the anticipated increase in production taken place. But during the later months of the year, it became evident that crops would not be as large as was originally expected. Even this created no impression upon the market until too late to materially affect the average price. Although the last few weeks showed a considerable advance, so much of the crop had already been sold that the benefit to producers will probably be counterbalanced by the expected shortage in supply.

Nevertheless, the outlook is at length decidedly more cheerful than for many years past; the certainty of moderate supplies gives time to work off the world's accumulated stock caused by recent over-production, while the fact that very little tea has been planted in either India or Ceylon for some few years back, obviates the probability of largely increased crops for some time to come, the planting of former years being mostly in bearing. It is now an ascertained fact that consumption at home has been but very little interfered with by the late increase in the duty, and that the normal rate of progress has been about maintained, while the lower prices of recent years have considerably increased the use of British grown tea in foreign and colonial markets. Consequently with a crop almost stationary and every probability of a continued increase in consumption, the conditions so long prevailing in the trade are likely to be entirely reversed. The natural result of over-production has been a continued fall in price, and conversely the outstripping of production by expanding consumption should be accompanied by a corresponding rise in value. Hence the industry looks now in a more healthy condition, and there is every reason to believe that for five or six years to come, *i.e.*, until any new lands which may be brought into cultivation commence to yield heavily, prices will be on a scale more remunerative to producers;—while should there be a decrease in the rate of duty the industry would, to some extent, be relieved of a very pressing burden, with the probable result of a further improvement in price.

GREEN TEA.—The quantity of green tea made in Ceylon has been gradually increasing and is finding favour in North America; India has this year also made some green tea which is being well taken and there is every probability that both countries will next year manufacture increased quantities, by which means the black tea market should be still further relieved.

INDIAN TEA CESS.—The Viceroy has decided to legislate for the purpose of raising a tax of one-fourth of a pie per lb. on the exports of Indian tea, for raising money to exploit new markets. Planters should therefore soon have larger funds at their command for promoting the use of Indian tea, both in India itself and in other markets. Foreign markets continue to expand satisfactorily, about 105 million pounds being taken against 95 millions last year.

PRODUCTION.—It is expected that the total crops of India and Ceylon will be about the same as last season.

INDIAN TEA.—The quality of the crop as a whole was hardly equal to that of last season, although Darjeeling showed a considerable improvement. The average price of Tea sold on garden account was 7·35d, against 7·50d in 1901, and from 1st June to end of December 7·24d, against 8·04d, for the same period last season.

CEYLON TEA.—There is not much change to notice in the quality, which on the whole was very fair and about up to the average. The average of Tea sold on garden account was 6·81d, against 6·86d in 1901, and from 1st June to end of December 6·66d against 7·05d for the same period last season.

JAVA TEA.—Production in Java has lately increased and imports were in consequence somewhat heavier, previous quality being maintained.

Table showing movements of Indian Tea (in lb) in London during the Season years 1899-1900 to 1902-1903.

IMPORTS.

	1898-9.	1899-0.	1900-1.	1901-2.
Indian	136073465	148968867	161945205	155757498
Ceylon	92946656	107509408	111213383	97916545
Java	3678280	4656540	4978610	6158390
China	27863637	31965903	22574864	24749780
Total for season	260,562,038	293,100,718	300,712,062	284,582,213

LIVERPOOL.

	1898-9.	1899-0.	1900-1.	1901-2.
Indian	142645712	154260541	150074398	150490003
Ceylon	90149698	102506046	110719670	101355798
Java	3610740	4365060	4763850	6059130
China	29650012	29613711	23863154	21614354
Total for season	266,056,162	290,745,358	289,421,072	279,519,285

STOCK.

	1898-9.	1899-0.	1900-1.	1901-2.
Indian	31501541	26209867	38889575	44157070
Ceylon	19790252	24793614	25743557	22304304
Java	715120	1006600	1221360	1320620
China	10064889	12417081	11117815	14253241
Total for season	62,071802	64,427,162	76,972,307	82,035,235

WATER SUPPLIES IN THE PLANTING DISTRICTS.

AN AUTOMATIC HYDRAULIC RAM WHICH WORKS A PUMP.

To secure a plentiful and pure water supply and to introduce it into their bungalows (which are usually built on a high elevation) is a difficulty which many planters have encountered, but one in a country where the chances of contamination are so numerous, which it is absolutely essential in the interests of health should be overcome. On Mount Vernon estate, a representative of the *Observer* has just seen a most ingenious and simple device for pumping water from a low to a high level and which is the first of its kind made and erected in Ceylon. At Mount Vernon by an inexplicable whim of nature, just below the Superintendent's bungalow which is situated on a hill, there runs a plentiful supply of river water while at the foot of the hill there rises a gushing spring of pure water. Under ordinary circumstances if it was wanted to introduce this spring water into the bungalow and have it pumped automatically, a turbine or Pelton wheel with suitable gearing for driving the pump would have had to be erected. This, of course, is an elaborate and expensive method and entails complicated working parts. Messrs Brown and Davidson were entrusted with the work of introducing the water and Mr J A Dickson of that firm, while engaged on the work, was struck with the possibility of making the waste water automatically work a pump to drive the water up the hill. The idea was followed out and the work was completed at the end of last week and there is now on Mount Vernon an automatic Hydraulic Ram actuating a pump. The ram is working under a head of 30 feet and delivering 25 gallons per hour of pure spring water into a receiving cistern with a holding capacity of 250 gallons at a vertical height of 140 feet. The idea is entirely new and original, most ingenious in its conception and simple in its design and reflects credit on Mr. Dickson's ingenuity. Hitherto rams have been employed in various parts of the island for supplying water to bungalows and factories, but in these cases the same water as supplies the ram is delivered at the bungalow. About four times the amount of water which is pumped, however, in these cases goes to drive the ram. The method here employed is specially effective and simple as no pure water is wasted and there is absolutely no chance of the pure water being contaminated by the waste water which does the work. There should be a large demand for this simple and much less expensive automatic ram.

CACAO.

The Ligu cacao (*Theobroma bicolor*) is now fruiting at the Botanic Station, Dominica. Several plants of the Alligator cacao (*Theobroma pentagona*) has also flowered. Both of these species were obtained from Nicaragua by Mr J H Hart, Superintendent of the Botanic Gardens, Trinidad. On one estate in Grenada where very particular attention is given to cultivation and manuring the efforts of the proprietor have been rewarded by a yield of 130 bags (of 182 lb each) of cacao from about 16 acres. This is at the rate of 8 bags per acre.—*Agricultural News*, Dec 20.

SOME QUEER TEAS.

Tea-drinkers frequently express sympathy for the unfortunate people who lived before the days of tea-drinking. There may have been compensation, but we doubt it. A writer in the *Globe*, under the heading "Some Queer Teas," recently called attention to the great variety of beverages and decoctions made from herbs and plants quite unknown in China or India, called 'teas,' in imitation of the genuine article and drunk from various motives. He says:—'In early tea-drinking days, when fragrant Bohea was sold for from twelve to twenty shillings and more a lb, poor folk, who could not afford such a luxury, endeavoured to content themselves with decoctions from less expensive leaves. A great favourite of old was sage-tea, which was regarded not only as a pleasant but a particularly wholesome drink. John Wesley, who was a determined opponent of the Chinese leaf, strongly recommended sage as well as mint

and pennyroyal, as an excellent substitute; while another enemy of the cup that cheers ventured to prophesy about the middle of the eighteenth century, that the pernicious foreign leaves would quickly become cheaper, wherein he was right, and that tea would then go out of fashion and be replaced by sage, wherein he was hopelessly wrong. At the time when this wise person wrote, an ordinary breakfast among the poorer folk was bread and butter with sage-tea; but the cheapening of the real tea simply drove such substitutes as sage out of use. In revolutionary days in America various herbal substitutes for tea were used from patriotic motives. After the Boston mob had thrown the cargoes of the three East India tea ships into the harbour, and the colonists had taken a vow to buy no tea which had to pay the obnoxious duty, their wives and daughters—'daughters of liberty' they called themselves—devoted their ingenuity to devising fragrant beverages to take the place of the boycotted leaf from the Far East, and some strange decoctions were made and perhaps enjoyed. The stalwart New Englanders drank 'tea' made from the leaves of rib-wort, strawberry plants, and currant bushes, sage, thoroughwort, and other herbs. So-called 'Liberty Tea' was made from the four-leaved loosestrife, while 'Hyperion Tea,' says Mrs. Earle—an invaluable chronicler of Colonial life and habits—was from 'raspberry leaves,' and was said by good patriots to be 'very delicate and most excellent.' The beverage may have been so when tasted by patriotic palates, but we can feel pretty certain that many a colonial dame must have thought with longing of the cups of fragrant Hyson which she had been accustomed to enjoy before the embargo was laid on the imported leaf. One at least of the substitutes named above, thoroughwort, is still used in rural New England for medical purposes, if Miss Wilkins' stories may be accepted as authorities. No reader of those delightful sketches will forget how often thoroughwort tea, as a remedy, especially for an ailing or more often supposedly ailing child, is suggested and made by village wisdom. Rural medicine of the same kind is, of course, common enough also on this side the Atlantic. Herbal remedies might not be used quite so much, perhaps, nowadays as in times gone by, but 'teas' from herbs of various kinds are still brewed and firmly believed in by many country folk. Valerian, for instance, which is commonly known by the significant popular name of 'all-heal,' is one of these herbs, for the 'tea' made from its root is believed to be of efficacy in cases of consumption. An infusion of milk-wort—the plant whose pretty flowers, varying in colour from pink to a deep blue or purple, are so abundant on dry, upland pastures—is good for a cough. In Sussex villages 'gazel-tea' is a favourite prescription for a cold. Berries of any kind are called 'gazels,' but those usually employed for medicinal purposes are black currants. But much stranger things than black currants have been similarly used. For example, when Queen Anne was known to be suffering from gout, a certain Martin Bowes wrote to the Prime Minister, the Earl of Oxford, suggesting as an easy cure a 'decoction, or tea, made of nettle-seed.' Not a few of the herbal teas which were drunk as beverages were, like the New England thoroughwort, also considered to have no small medicinal value."—*H & C Mail*, Jan. 2.

THE CURE FOR MOSQUITOES.

A POT OF BASIL.

There is a widely spread belief, both amongst natives and amongst the white sojourners in Western Africa, that the presence of a certain species of plant in a room drives away mosquitoes, and, in fact, a single plant is said to be sufficient to clear a room. On his recent return from Northern Nigeria, Major J A Burdon, of the Cameron Highlanders, brought with him and gave to me a few leaves of this plant. These, through the kindness of Mr. H H W Pearson, have been identified by the experts at Kew as belonging to *Ocimum viride*, Willd., a member of the order Labiatæ, which occurs from Senegambia southwards to Angola.

Major Burdon, who is Resident of the Nupe Province, Northern Nigeria, and Hausa Scholar of Christ's College, Cambridge, has given me the following account of the plant :—

"A fragment of what turns out to be *Ocimum viride* was given me in August last at Lokoja, Northern Nigeria, by Captain H D Larymore, C.M.G., R.A., Resident of the Kabba Province. Capt. Larymore's notice had been drawn to the plant by a native living in a low-lying part of the native town at Lokoja, who had told him that the natives suffered very little from the swarms of mosquitoes which existed in that part, as they protected themselves from them by the use of this plant.

"Capt. Larymore made inquiries and obtained a few specimens of the plant, which grows wild, though not very abundantly, in the neighbourhood of Lokoja. These specimens he planted in pots and boxes and kept in and about his house. The specimens I saw were about the size of a geranium.

"He informed me that the presence of one of these plants in a room undoubtedly drove the mosquitoes out, and that by placing three or four of the plants round his bed at night he was able to sleep unmolested without using a mosquito net. This is very strong testimony to the efficacy of the plant, for the house in which Capt. Larymore was living is, as I had cause to know well in former years, infested with mosquitoes."

In the fifth volume of Sir W T Thiselton-Dyer's "Flora or Tropical Africa," *Ocimum viride* is described as follows :—

"*O. viride*, Willd.; Benth. in D C. Prod. XII. 34. A perennial 3-6 ft. high, with much-branched glabrous stems. Leaves distinctly petioled, oblong, acute, membranous, 3-4 in. long, glabrous on both sides, or obscurely pubescent beneath. Racemes, lax, copiously panicled, 3 6 in. long; rhachis finely pubescent; bracts deciduous; pedicles not very short. Calyx 1-6 in. long; tube companulate; upper lobe orbicular, as long as the tube; lower teeth short. Corolla half as long again as the calyx-lobes. Stamens but little exerted, the two upper with filaments toothed above the base. —Benth. in Hook. Niger Fl. 488; Henriques in Bolet Soc. Brot. X. 149. *O febrifugum*. Lindl., in Bot. Reg. t. 753. *O. heptodon*, P. Beauv. Fl. Owar. 11 59, t. 94."

The plant is figured on plate 753 of the ninth voume of the Botanical Register, 1823 under the name *Ocymum febrifugum*, or the "Sierra Leone Fever Plant." This work mentions that the plant is "in request at Sierra Leone for medicinal purposes," and describes the species as an "*under shrub* 3 feet high," "having in a high degree the smell of common balm."

The leaves of the plant are highly glandular, and in India an allied species, *O. Basilicum*

Linn., the "common sweet basil," produces a "yellowish green volatile oil lighter than water, which, on being kept, solidifies into a crystalline camphor, isomeric with turpentine camphor." (*Gmelin's Handbook*, xiv., 359). The seeds of this species are widely used in the east as a medicine, and their properties "are said to be demulcent, stimulant, diuretic and diaphoretic." "The juice of the leaves mixed with ginger and black pepper is given in the cold stages of intermittent fever." The leaves, like those of thyme, are used as a reasoning in cooking. Another Indian species, *O. sanctum*, Linn., the "sacred basil," is the most sacred plant in the Hindu religion, and is consequently widely cultivated.

In "Notes on the Medicinal Plants of Liberia," Mr E M Holmes records that when chewed or rubbed, the leaves of *O. viride* give off a strong odour of lemon thyme, and mentions that Dr Roberts, of Liberia, entirely substituted the use of the plant for that of quinine in cases of fever of all kinds, giving it in the form of an infusion.

There is thus a good deal of evidence that *O. viride* is a plant of considerable curative value, especially in cases of fever, but the question that interests a large number of people in West Africa is whether it is equally efficacious as a preventative. Does it really repel the mosquito which acts as the intermediary in conveying the malarial hæmatozoon from man to man? Further experiment on this point is needed, but there is at least some indication that in this easily cultivated plant man has another weapon with which to fight malaria. A. E. SHIPLEY.

Christ's College, Cambridge.

—*Nature*, Jan. 1.

NORTH BORNEO.

(From the *North Borneo Herald*, Dec. 16.)

FUEL.—It has been proposed that when coal is exhausted, the eucalyptus should be cultivated for fuel. In hot countries the gum-tree can supply 20 tons of fire-wood per acre a year. To this end the cultivation of the eucalyptus tree which grows to a great height and affords plenty of shade, should be introduced and encouraged in British North Borneo where the climate is eminently suitable for the purpose.

BORNEO TOBACCO.—Tobacco from our young colony of North Borneo, the *Pall Mall* is glad to see, is holding its own, and up to the end of last month, 15,885 bales of the 1901 crop were sold in Amsterdam at an average of 90 cents per half-kilo, while the average of the Sumatra crop was only seven cents more. On the other hand, however, the highest price obtained for Borneo was 181 cents which compares very favourably with 135 cents for the best Sumatra leaf. "El Mandano" is an excellent cigar made from leaf grown on the Bongon estate of the New London Borneo Tobacco Company (Limited), which has produced some of the best tobacco raised in the colony since the cultivation of the fragrant weed was introduced.

THE EAST COAST.—The following is from a most interesting account of His Excellency's tour of the above territory:—I came away very satisfied with all I saw and confident of the future prosperity of this part of the Territory. The tobacco estate belonging to Mr. Kortmann at Tawao is closed, but Mr Arensma's Company on the Segama is in full swing. I visited every estate and was very hospitably entertained. The number of fields planted is 625 and the average yield over 9½ pikuls. If prices approximating those of 1902 are obtained there will be great jubilation in Darvel Bay. As it is every one is very contented. I visited Mr Phillip's coal workings at Serudong and was greatly pleased. He has cut along a seam of coal for 137′ and its width is 3′ 4″. Mr Phillips has traced a tramway line for about 2,000 yards to the tidal river and, if the coal is in payable quantity, it could be transported in lighters to Sandakan where a wharf in deep water, could be erected at inconsiderable expense and where the coal would always find a ready market. I believe there is tin in Tawao and I know now that there is coal at Serudong. If therefore, the British Borneo Syndicate expends in those places some of the money it is bound to lay out in prospecting the territory, there is every hope that a bright future lies before the East Coast.

TEA IN AUSTRALIA IN 1902.

The year 1902 has been unsatisfactory for traders in this article. The removal of the duty by the Federal Government found dealers with more or less heavy duty paid stocks, on which a loss of 3d per lb. had to be faced. In addition, there was an impression amongst the trade that financial necessities would induce the Government to try and reverse the decision of Parliament, and in anticipation thereof large sales were effected at high prices. Tea, however, remains free of duty, and it has taken many months to get rid of these surplus stocks on a market which has been continuously adverse to all holders.

A further adverse element was the unexpected action of the Federal Government in condemning on a purely chemical analysis (which was part of the Customs Act) certain teas imported from India and Ceylon, because they contained a limited portion of ash in excess of the academical standard laid down by the act, although the tea extract they contained was largely in excess of the standard, and by the analysis they are admittedly "fit for human consumption." The contention of the trade is that reasonable notice should have been given to importers viz., time to advise their agents in the Far East, and that it is impossible to know whether teas comply with the act until their arrival in the States and analysis here. On these grounds permission has been requested to reship the teas in question.

It is now hoped that the Government will amend the clause relating to tea in the Customs Act—on the lines of the American Customs Act—which thoroughly protects the public without harshness to the trade. Over-importation during the past two years, due to tariff speculations, also contributed to depress the market, so that during the greater part of the year complaints were heard amongst all sections of the trade. For the past few months, however, imports have been restricted, and stocks are now getting into a more healthy position.

COLOMBO continues to be the main source of supply. Imports, however, will be fully 10 per cent less than last year. Prices in Colombo have risen considerably, owing to the London market recognising the strong statistical position of tea generally, and this market will, doubtless, follow

suit. With very moderate stocks held in the States, the new year should see a larger business passing on sounder lines, the present position being certainly in favour of stock holders.

Indian teas have been disappointing in quality. The earlier shipments were distinctly good, but with heavier arrivals the teas seemed lacking in point and distinctive quality, and they have certainly lost ground with the blenders as compared with Ceylon. The trade, however, are quick to notice all teas with point, as they form a valuable element in all blends owing to their superior keeping quality, as compared with Ceylon.

The Calcutta market has risen considerably in the last three months, especially in common teas. The crop is expected to be less than was estimated, and an early closing of the season is looked for Colonial imports will be 25 per cent. below last year.

China teas are getting into smaller and smaller compass. The year's imports will only be about 1,000,000 lb ; the only demand has been for a little fine tea, fine buds, fine Panyongs and scented teas, which are in short supply. Kooloos are not so much used, and their sale has been slow and unprofitable. Stocks are now very much reduced, but the outlook for next year is very poor. —*Age* Jan. 2.

JAVA GOVERNMENT CINCHONA PLANTATIONS.

A sum of 289,000 fl. has been allotted to the Java Government cinchona-plantations, in connection with the estimates for 1903. This sum is an increase of 189,000 fl. on the estimates for 1902. It is intended for the purchase of quinine, gathering, manufacturing, transport, and sale of cinchona, &c. In 1902 the production of Government bark was estimated at 1,000,000 Amsterdam lb but this year they hope to increase the output by 50 per cent.—*i. e.*, 1,500,000 Amsterdam lb. In view of this, and also because more money is required for laying out new nurseries, upkeep of nurseries, &c., expenses of the Government plantations are estimated at 5,000*l*. There is also an increase of 3,250*l*. in the estimates for the purpose of meeting the extra cost of manufacturing the quinine produced by the Bandong Quinine Works. The revenue for 1903 is expected to realise 399,000 fl.; chiefly derived from the sale of Java quinine.—*Chemist and Druggist*, Jan. 3.

EWART, MACCAUGHEY AND COMPANIE'S ANNUAL **TEA** REPORT, 1902.

CEYLON.

The New Year brought in a strong market, particularly for common tea, which was quoted at 6¼d per lb, while over say 6¾d per lb. there was considerable irregularity. With occasional fluctuations the general feature of January was firmness for tea up to 7d per lb and great irregularity over that figure. Worse quality towards the end of the month led to an easier market, and in February prices favoured buyers, common leaf receding to 5¾d per lb or 5½d per lb., while Broken Pekoes round about 6d per lb were remarkably cheap. Importers were inclined to meet the market when anything near to valuations was bid, so that little tea was held up Quality on the whole, if not fine, was fairly useful and the range of prices worked all in favour of a very large trade, the blenders particularly in buying freely from week to week. Good tea was coming along in March, and from 1s 1d per lb there were plenty of buyers, but plain ordinary Pekoe kinds from 6d per lb to 7d per lb ruled easy, and Colombo bought invoices were not receiving much attention. A large proportion too, although fine, was over light in cup for home requirements, and, lacking support from foreign buyers, went very cheaply. After the Budget in April we had an easier market, and from 5¾d per lb there was a general ¼d per lb decline, while tea for price was at 5½d per lb. The month closed with heavy offerings, mostly of poor quality, and averages began to look very bad, teas between 6d per lb and 7d per lb being a perfect drug on the market. The general feature pretty well followed Indians in that from 5d per lb to 7d per lb prices were anyhow, while over 11d per lb top rates were being paid. The middle of May brought more general enquiry and, as a whole, better quality. Common stood at 5d per lb, and tea far and away better at 5½d per lb, all grades over 10d per lb making fancy prices. June opened with an easy market under 7d per lb, although common stood at 5d per lb against 3¾d per lb or 4d per lb in the previous season. Fine kinds were dear, in fact, much of the tea that was being paid up for would in ordinary times not have been called fine at all. There were, however, no Darjeelings to speak of, and this fact largely helped up any Ceylon with the smallest approach to quality Common dropped to 4¼d per lb before July, with Pekoe quotations of 4½d per lb, and excepting one week in 1901 the average price of 6d per lb at the beginning of the month was lowest on record. Weekly offerings were at this time very heavy, 36,000 packages being nothing unusual, but towards the close there was a slight rally and the month finished with a healthier feeling. Quality came a little better again in August, and Auctions dropped to about 28,000 packages a week. A slightly better enquiry set in, as buyers could not let teas go past them at the tempting range of prices. A considerable Export business, too, came along, the unusually low prices having attracted attention all the world over. September came in badly for common and plain kinds of teas and, just as on the Indian market, everything without special character stood on a dead level of cheapness. Pekoes at 5d per lb to 5½d per lb were showing wonderful value, while commonest leaf was quoted at 4¼d per lb. Good medium tea fell ½d per lb in the middle of the month and, with the blenders more or less standing out and few Export orders, only extra fine parcels were doing good. The early October sales showed conspicuously better quality from many estates and improved competition resulted. Common, too, advanced a little but there were still 4½d per lb quotations. Russian orders were invaluable in helping prices for flavoury kinds, and but for them, some of the fine light teas would have fared badly, particularly as outside influences not usually calculated upon, were upsetting everyone. A carefully engineered boycott demoralised the closing Auctions, but November brought along some recovery, and from 4¾d per lb at the opening, common tea went to 5¾d per lb at the close of the month, showing 1¼d advance form lowest point, while in the case of medium to good kinds the rise was even more pronounced. Buyers made another attempt to get the market down in December, but on this occasion the importers would not humour them, and although some cheaper tea was sold the general instructions were to take out any invoices which did not reach previous quotations, and common leaf closed at 5¾d per lb. The feature of the year has without doubt, been the extraordinary value generally shown among teas from just above common to just under fine. The whole weight of offerings as a rule has ranged from 5d per lb to 9d per lb. The quantity of fine tea included was never excessive, and for a large portion of the year not sufficient for the ordinary weekly requirements of the trade,

INDIAN PATENTS.

No. 502.—Charles George Landseer Judge, journalist, of 47, Free School street, in the town of Calcutta. An improved machine for colouring and finishing green teas by the process known as panning.

No. 503.—William Lennox, tea planter, of Luskerpore Tea Company, Limited, Chandpur Bagan, South Sylhet, Assam, in British India. A new, or improved sifter and ball breaker for tea leaf and the like.—*Home paper.*

SAMOA.

The Chief Justice and Governor of Samoa, under the German dispensation (the Hon. Dr. W H Solf), passed through Sydney this week to take up his duties after a 12 months' vacation. He came to Sydney in the "Tanglin" after visiting China, Java, the Philippine Islands, and New Guinea, and probably the information he obtained there will be turned to account at Apia, as, according to the ruler of Samoa, it is intended to introduce Chinese or Javanese labourers to do planting and general coolie work for the Samoans. Of course Fiji is already full of Indian, Chinese, and Japanese coolies working the sugar plantations, and at Noumea they are trying similar blends in the mines, but it is impossible to escape a feeling of regret that—as is inevitable—the Samoan type which R L Stevenson and all others who have lived at the islands learned to love should be subject to the intermixture and contamination inevitable where such labour is imported. Dr. Solf is quite a historical character in Samoan affairs. He was president of the Triple Alliance Council—England, America, and Germany—before the war, and German Governor since the main island was apportioned to Germany three years ago. He has faith in the industrial development of the country, and it is the spirit of the age to place industrial development first. —*Sydney Mail*, Dec. 31.

THE WYNAAD PLANTERS' ASSOCIATION.

THE ANNUAL MEETING.

We extract the following from the Minutes of the Proceedings of the Annual and General Meeting held at Meppadi Club, on the 7th inst.:—

Present :—Messrs. Abbott, Atzenwiler, Day, Mackinlay, Romilly, Taylor, Waddington, West, and B. Malcolm, Honorary Secretary. Mr. G Romilly in the Chair.

The Honorary Secretary read the Annual Report for 1902.

[FROM THE ANNUAL REPORT.]

Pepper Disease.—After two years of almost incessant agitation we have received the good news that the Government of Madras has sanctioned Mr. Barber visiting the district, and arrangements for his tour have just been concluded. Though much valuable time has been lost, and the disease has made rapid strides, we must hope Mr Barber will succeed in suggesting a cure. No small share of our thanks are due to His Excellency the Governor for this aid, and we also owe our thanks to Mr Windle, of the Nilgiris, for representing the matter to His Excellency in person.

Duties : British Import Duty on Tea.—The Resolution passed at the last U P A S I Meeting has so far resulted in the matter having been referred by the Indian Tea Association to its London Committee. That hesitating body is considering the best means of approaching the Chancellor of the Exchequer. It is to be hoped that it will be able to solve the problem in time to approach him before the new Budget is framed. Seeing the promise made to the Ceylon Association some two years ago it is difficult to understand the diffidence with which this matter is being taken up.

French Import Tariff.—It was decided at Bangalore "that as the matter was receiving the attention of Government, we confidently left it in its hands."

In the meantime the Ceylon Government has arranged matters for the Island and the Chairman of the U P A is taking action in referring the matter again to the Government of India.

Coffee Cess.—A fair number of Members in this district have agreed to support this Cess on the condition that the scheme, when published, meets with their approval.

Tea Cess.—The Cess we agitated for is being allowed by the Government of India and it is intended that it should come into force on the 1st April. Our effort to obtain a larger share of representation for S. India has not been successful and it now remains with us to decide whether in our opinion both the representatives allotted us should be planters, or one of them a Member of the Madras Chamber of Commerce, which body has consented to appoint one of its number if required.

Sale of Tea in S. India.—In this connection I may say that we hoped last year that the Ceylon import duty might be abolished. The representation to the Government of India to act in the matter has not been successful however. It becomes all the more necessary, therefore, that we should strain every nerve to capture our share of the Indian market. The demand for dust tea that exists is, at present, largely supplied by rubbish from Ceylon. We have the opportunity offered by Messrs Parry & Co. of Madras, who, with the Agencies they have in almost every town of any importance in S. India, afford a ready-made Distributing Agency which should enable the S. Indian planter to control the S. Indian tea trade. It is a matter for comment that one of the largest blenders in England, Messrs Brooke Bond & Co., are advertising the sale of their blends in Madras.

Coffee Crop prospects are fairly good in the district ; but prices unfortunately do not promise to improve. We must hope that the Leeming System, which has proved so successful on the Shevaroys, and which there is every reason to think will answer here, will prove our salvation.

Tea has, on the whole, had a good flushing season and prices are improving.

Pepper Crops are decidedly good and prices maintain a good level.

Our numbers have fallen off considerably during the past year—six members having left, and one new member joined.—*M Mail*, Jan. 21.

The Mosquito Plant Cure.—From *Nature* of January 1st, interesting latest particulars are given on page 555, regarding the West African plant, Basil, which is said to have a wonderful effect in keeping off mosquitoes. The Peradeniya Staff should import and keep as large quantities of the plant as possible on sale.

TO THE PLANTING WORLD.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop August-September delivery 1903, booking necessary before the end of April, quantities of 100,000 and over at special low rates. Plants available all the year round, 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th November, 1900 :—" I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year." Special offer, post free on application.

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for October-November delivery 1903, immediate booking necessary; large quantities on special terms ; Plants in Wardian cases.

A foreign firm of Planters writes under date 11th October, 1901 :—" We beg to enquire whether you would procure us 100,000 Castilloa seeds, in which mouth we might expect them, and what would be the average price." Special offer, post free on application.

Manihot Glaziovii.—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter iu sending an order for this seed wrote on the 22ud August, 1900 :—"If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castlloa does not thrive."

Ficus Elastica.—Seeds available in May-Juue; booking necessary before the end of March; also plants.

Mimusops Globosa (Balata) wood of the tree is much sought for buildings, fruits sweet like a plum and eaten, oil from seeds, said to yield as much as 45 lbs. of dry rubber per tree per aunum, the milk is drunk aud when diluted with water used as cow's milk, grow from-sea-level up to 2,000 feet, orders being booked for seeds and plants, price on application.

Cinnamomum Zeylanicum (Cinnamon superior variety).—New crop of seed in April to June; booking necessary before the end of February, also plants.

Coffee Arabica-Liberian Hybrid.—A highly recommended leaf-disease resisting hardy new variety of Coffee (cross between Arabiau aud Liberian). New crop March-April ; immediate booking necessary.

A foreign Agricultural Department writes dating 9th September, 1901:—" Please accept our order for 175 lbs. of Tea seed and for 2,000 Coffee beans. In regard to Coffce seed I would say that this will be the first importation made by this department, and we will leave the selection of the varieties to be sent to your judgment."

OUR DESCRIPTIVE PRICE LISTS.

The following six Descriptive Price Lists are now being forwarded with Circulars and special offer of Seeds and Plants of Rubber and other Economic Products :—

1. Tropical Seeds and Plants of Commercial Products, enlarged edition for 1902-1903.
2. Seeds aud Plants of Shade, Timber, Wind-Belts, Fuel aud Ornamental Trees, Trees for Roadsides, Parks, Open Spaces, Pasture Lands, Avenues, Hedges, and for planting among crops (Tea, Coffee, Cacao, Cardamoms, &c.)
3. Seeds and Plants of Tropical Fruit Trees including Mango grafts.
4. Bulbs, Tubers and Yams.
5. Orchids—Ceylon and Indian.
6. Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons, Roses, Dracinas, Shrubs and Creepers.

Special Arrangements made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in larger quantities.

" SOUTH AFRICA."—The great authority ou South African affairs of 25th March, 1899, says :—" An interestiug Catalogue reaches us from the East. It is issued by WILLIAM BROTHERS, Tropical Seed Merchants of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to aud prove that they were worth the grabbiug. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Agents in London :—MESSRS. P. W. WOOLLEY & Co., 90, Lower Thames Street.

Agent in Colombo, Ceylon :—E. B. CREASY, Esq.

Agent in British Central Africa :—T. H. LLOYD, Esq., Blantyre.

Telegraphic Address: WILLIAM, HENARATGODA, CEYLON.

Liber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS, *Tropical Seed Merchants*, HENARATGODA, CEYLON.

71

KNUCKLES, KELEBOKKA AND PANWILA P. A.

REPORT FOR THE YEAR.

There are now 28 estates on the register.

Tea.—Acreage in tea is 10,109 acres, of which 9,880 are in bearing.

Estimated crop for 1903 is 4,047,000 lb. which shows a yield of 409 lb. per acre.

Native leaf, 689,000 lb. leaf.

Accounts were laid on the table, and show a credit balance of R98·52.

DIMBULA PLANTERS' ASSOCIATION.

SEASON 1903 : TOTAL ESTIMATE OF TEA CROP IN DIMBULA DISTRICT.

	Total Acreage in Tea.	Total Acreage in Bearing.	Total Estimated Crop.	Crop per Acre.
111. Estates total	45,925	45,047½	21,786,535	483
Previous year, 1902	45,806¾	44,718½	22,647,619	506
Increase	118¼	329	—	—
Decrease	—	—	861,084	23

E. & O. E.

75 Acres were left to rest.

Eleven (11) Estates have not sent in returns for this year.

One (1) Estate sent only the acreage and did not mention the crop.

1902-1903.

THE DIMBULA PLANTERS' ASSOCIATION : COMMITTEE'S REPORT PRESENTED TO THE 28TH ANNUAL GENERAL MEETING.

19th Jan., 1902.

Membership.—The subscribers for 1902-1903, number 96 estates :—The total is (4) four Subscribers less than 1901-1902 ; (3) three estates and (1) one private. The three (3) estates have failed to pay, although two (2) had promised to do so. The private subscription was not paid owing to absence in Europe of the payer.

FINANCE.	R	c.
By Balance brought forward from 1901-1902	192	25
" 96 Estates Subscriptions at R5 ...	480	00
" Rent on Doctor's Bungalow, "Belgravia"	10	00
" District Road Grant for 1902-1903 ...	1,000	00
Total ...	1,682	25
Less. Spent on District Roads and Sign Posts, 1902-1903	1,004	67
Less. D. P. A. Expenditure Account in 1902-1903	677	58
	R540	19
Balance to be carried forward—Total ..	R137	39
Expenditure in 1901-1902	R585	35

Meetings.—There have been (4) four Committee and (4) four general meetings during the year. Several members of Committee have only attended (1) one meeting and it is to be regretted that keener interest is not taken in the affairs of the Association and of general import. The average attendance for the year has been for Committee, 12. General meetings, 23. It will be observed that the average attendance in Committee for the year, has been less than half of the members appointed: a most disappointing result ; whereas, the average attendance in general meetings has been considerably greater than in the previous year, which is satisfactory and encouraging.

Acreage and Crop Estimate for 1903.—The total Acreage of the District is 45,925 in tea ; in bearing, 45,047½ acres. The estimated crop for 1903, as far as it has been possible to collect, is 21,786,535 lb. of Black Tea, or an average of 483 lb per acre. These figures show a decrease in tea of 861,084 lb. and a decrease in yield of 23 lb. per acre under 1902.

Season, 1902.—The bad flushing weather during the latter part of the year, has caused low yields, consequently estimates are short in most cases, Prices throughout the district have been generally well maintained and in a fair number of instances are higher than those during last year. Plucking has been careful, but owing to the shortfall, profits are probably less than in 1901 on the majority of estates.

Labour.—Owing to less crop being harvested during the year, labour has been enough to cope with work done on estates generally ; which is satisfactory. Your Committee would, however, impress on employers of labour, the necessity of recruiting more labour from the Coast during 1903, in order to maintain their labonr forces to required strength and to avoid as far as possible issuing further advances to those already in Ceylon. That special efforts be made to tap new districts and if considered advisable to appoint a special recruiting agent.

Labour Federation.—There has been one case brought before the District Sub-Committee during the year between Ambegamuwa and Dimbula planters ; the final decision exonerated the Dimbula planter as having been decided by one of his kanganies.

District Minor Roads.—The amonnt granted by Government towards the upkeep of these roads for this year was R1,000 ; out of this R288·15 was spent on sign-posts. Consequently after paying the votes granted for District Roads amounting to R716·52, there is a debit balance of R4·67 which the Association is obliged to pay pending supplementary grant to meet the expenditure on sign-posts from District Road Committee. Your Committee would point out that owing to the heavy expenditure on sign-posts during the past two years, grants for upkeep of District Minor Roads have had to be reduced to a minimum, which has been detrimental to proper maintenance of the roads throughout the district.

Sign-Posts for District Minor Roads in Dimbula.—Your Committee have to report that up to 31st December, 1902, R288·15 has been spent on the completion of the sign-posts undertaken. The total spent in 1901 and 1902 under this heading has been R757·33, which, so far has been deducted off the Annual Grants, allowed by Government for upkeep of District Minor Roads in Dimbnla. It is hoped that the District Road Committee will be able to pay us an extra vote in 1903, towards the outlay under this heading. Your Committee would advise that the chaining of the Bridle Roads should be undertaken directly funds are available, in order that each District Minor Road may receive its Annual Grant in proportion to its mileage.

Main Roads.—Your Committee are pleased to be able to report that the Main Roads in the District have been on the whole, well maintained during the year. It is satisfactory to note that the improvements suggested by the Association are likely to be provided for in the 1903 estimates,

It is hoped that the improvements ultimately decided on, may be carried out expeditiously and on economic lines.

HOSPITALS AND DISPENSARIES.—Your Committee are glad to report that, to the best of their knowledge, the Craigie Lea and Lindula Hospitals and Dispensaries have been sufficient to meet the demands made on them in their respective vicinities:—The promised Agra Patanas Hospital has not yet been sanctioned, although, it is highly desirable that the mortality amongst coolies should be reduced.

FIREWOOD SUPPLY.—There have been no complaints made to the Association during the year; it is, therefore, presumed that the fuel Depot at Talawakelle has worked well and continues to give satisfaction to those estates interested therein.

PLANTERS RIFLE CORPS.—The strength of the corps in our District continues satisfactory:—The interest and keenness shown in Shooting is marked:—The District is to be congratulated that their Distinguished Officer Commanding the Planters Rifle Corps, has been deservedly promoted to be Lieut.-Colonel:—Your Committee would urge on all Volunteers, the necessity for making themselves thoroughly efficient in the use of the Rifle, besides, making themselves competent in Drill.

TIN TICKET SYSTEM AND REGISTRATION OF ESTATES.—Your Committee are pleased to report that this new scheme inaugurated by Government about a year ago, has given satisfaction so far:—It is thought that advances have been reduced thereby and that as it becomes better known and more widely adopted, it is calculated to produce even better results than hitherto, when thoroughly understood:—It is hoped that every Estate in the District has registered, but should there yet be some who have not done so, your Committee would urge on them to do so without delay.

COOLY BOLTERS.—Your Committee regret to report that the prevalence of Bolting and repudiating Advances amongst Canganies and Coolies, at one time during the year, threatened to assume serious proportions; but happily it has somewhat abated of late:—Your Committee would urge on employers the necessity for studying the cause of this serious evil, with a view to checking its further spread if possible:—It is thought that to some extent it might be reduced, if employers of labour would desist from retaining coolies, who want to leave their Estates, against their will:—It should not be forgotten that "The Indian" in the eyes of the law, is a free Agent; therefore, if his services cannot be retained by fair persuasion, it is best to pay him off and recover advances; to prevent him taking the Law into his own hands, and thus create a bad precedent on an Estate:—It has been brought to the notice of your Committee that some Proctors have unsettled Labour, but it would remind employers, that if coolies do not derive any benefit from the advice given by those gentlemen, it is not anticipated that labour will adopt this method on a large scale.

MEMORIAL WINDOW.—Your Committee have to report that the Memorial Window subscribed for by the friends of the late Mr. Sandys Thomas has been erected in the Lindula Church during the year:—It is a handsome window and adorns the Sacred Edifice which was frequented by the Deceased.

BULK PETROLEUM AND LIQUID FUEL INSTALLATION.—Your Committee are pleased to report that Installation for Kerosine Oil and Liquid Fuel are under erection at Talawakelle Station and when completed will meet a long felt want in the District:—It is hoped that everyone who can conveniently make Talawakelle their outlet will support Messrs. Delmege, Forsyth & Coy's enterprise.

DIMBULA HALL.—The question of Rebuilding the Hall was considered again during the year, but nothing definite was agreed upon.

THE CEYLON NURSING ASSOCIATION.—Your Committee would remind managers of Estates of the suggestion made, to endeavour to induce their Proprietors to subscribe to this Association:—It is hoped that some have been successful, but those who have not received permission to support this worthy institution, may yet try once again when the time is opportune.

OBITUARY.—[?].

MR. T. FAIRHURST'S ADDRESS ON "OOLONGS."

(*Before the Dimbula P. A. Annual Meeting.*)

Mr. Chairman and Gentlemen,—When I met Mr. Welldon in the train the other day, he asked me if I would lay before you what little knowledge I possess concerning China Oolongs. I have pleasure in doing so, but regret that my knowledge refers more to the tea as ready for shipment than to its actual manufacture. In China, European merchants are confined to the Treaty ports—travel in the interior of the country being discouraged by the Chinese and only entered upon with what amounts to a "safe-conduct" in the form of a letter from some high official to all Government officers in the interior. The purchase of land by Europeans, outside of the Treaty Ports is forbidden by Chinese Law, and so it happens that we who live at the threshold of the tea districts, know so little of the methods of manufacture. Even were the necessary permission to visit those districts obtained, the very rough nature of the country, necessitating travelling in comfortless boats up rivers encumbered by rapids, making progress very slow, together with contact with the frequently unfriendly dwellers by the river, would deter most men. We, therefore, only come into contact with the tea after it is manufactured and packed, as is the case in Colombo. The nearest tea district to Foochow lies about 20 miles distant, and the leaf is frequently brought into that town in a half-finished state. Thus we see a little of the later processes, such as firing or drying and sorting. Some years ago it was possible to see the final stages of green tea manufacture, but at Foochow only a low grade of green tea was made, very highly coloured, and when the United States legislated against the excess of colouring matter, the manufacture in Foochow ceased. All other teas than those of the near district which I have mentioned, are manipulated and packed on or near to the spot where they are grown. Touching Oolongs in particular, Foochow and Amoy in China, and Tamsui in the Island of Formosa, are the ports of shipment. As regards Formosa Oolongs, these, as their name indicates, are grown in the Island of Formosa—the principal market is at an inland town distant about 15 or 20 miles from the port of Tamsui. The leaf in a partially prepared state is purchased by Europeans or their Agents and brought down to Tamsui for final manufacture. This is done not only by Europeans but by Chinese and the teas thus prepared are sent by steamer to Amoy on the China Coast, for final shipment to the different markets in the United States and England. The teas so shipped from Tamsui by Europeans are mostly already ordered by their constituents, whilst those shipped by the Chinese are intended for sale on the Amoy market to the European buyers.

The teas grown in the island of Formosa, are all of one variety ranging from common to extra choicest. The best "chops" are frequently scented with a flower belonging to the Jasmin tribe. The soil of the island of Formosa is volcanic and very rich, and it is to this that the teas grown there owe their special and peculiar flavours. This is proved by the fact that the tea trees in Formosa are grown from seed imported from Amoy—the produce of the parent trees on the China side possessing nothing of the peculiar Formosa quality and like all Chinese teas deteriorating so much, that the produce of the Amoy gardens has practically ceased to be cultivated.

I myself some years ago, to my after regret,

IMPORTED INTO CEYLON SOME SEED FROM THE FORMOSA TREES,

and the resulting plants reverted to the worst China type. I am of opinion that this type of Oolong, kuown as "Formosa Oolong," cau never be produced in Ceylon to possess the true characteristics of the type. But it is different with the Oolongs made and grown at Foochow. Of these there are *three* varieties, and I see no reason why their mannfacture should not be successfully attempted in Ceylon. These varieties differ materially in make and flavour. The best are usually brought to market in what are called "String chops," that is they consist of "lots" varying from 500 to 3,000 half-chests, which must be bought *altogether*. There are usually 5 grades in each "string," "common" to "choice," and they are sold at an average price for the "lot," which the European buyer calculates by working out each grade at his idea of its value. The lower grades are large in leaf approximating to the leaf of an up-country Pekoe Souchong of long leaf. The size of the leaf decreases as the quality improves, until the best would resemble in size, a boldish pekoe. The iufused leaves show a greenish colour, very even in the finer ones, but becoming mixed with darker leaves in the lower grades. The liquor is soft and fine iu the better teas, becoming coarse in the commoner ones. Black leaves in Oolongs are highly detrimental, and canse danger of rejection by the United States Tea appraisers. No Tea intended for the United States market should contain more than 10 per cent of dust. The price paid for these in China is based on, say b.o.i.f. New York up to about 1/3. The only other kind which requires special notice is a variety made more after the style of Congou or Black Teas as regards the size of dry leaf, but of course showing the same light-coloured infused leaf and liquor as the variety previously spoken of. The flavour however differs greatly, for whilst, with all their softness, the first kind mentioned as "Stringchops" possess a good deal of pungency—the last named variety—known as "Suey Kut" Oolongs, taste more like the Black Teas from the Suey Kut district, and have little distinctive Oolong character. The leaf, especially of the finer sorts, resembles closely the teas which were being made in Ceylon 3 years ago, as Ceylon Green Teas Their value ranges from about 10 cents, say 5d, to 1s. 2d.

The remaining kinds of Oolong grown in Foochow are mostly of large leaf, and varying quality, many being below the standard insisted on by the United States.

The average crop of tbo Formosa Oolongs amounts to abont 15 to 17 million pounds, aud of the Foochow Oolongs to about 5 millions. But both crops are liable to sudden increase according to demand, and this has been exemplified during the season of 1902 by an increase in the Foochow production of 50,000 ½-chs. equal to 2½ million ponnds, owing to the speculative demand from America contingent on the abolition of the Tea Duty there.

I think that the class of Oolong known in Foochow, as

"SUEY KUTS" COULD EASILY BE IMITATED IN CEYLON,

but whilst "Suey Kuts" were on their first introduction into America, much liked and eagerly bought, there is not now the same demand for them. As regards that, I would suggest enquiries being made from some of the leading New York brokers, whilst as to the processes of manufacture—of both Foochow and Formosa Oolongs—the best way would be to ask the information from the British Consuls at Foochow and Tamsni. And the information wonld be more readily obtained if the request for it is forwarded through the Government of Ceylon, English Consuls abroad not being very well disposed to incur trouble over trade matters, which are regarded as somewhat outside their province. I would also recommend that a similar application should be made through the German Consul in Colombo to the German Consuls at the ports named. All Green Teas and Oolongs should be packed in half-chests containing 54 to 60 pounds Tea net. My own connection with China has practically ceased, but I could give the names of one or two firms in Colombo who could, I think, procure large samples of Oolongs, and possibly assist in obtaining particulars of their manufacture. I will now reply categorically to the

QUESTIONS WHICH YOUR CHAIRMAN HAS ADDRESSED TO ME.

"How many kinds of Oolongs are sold in America?"—The reply is, three from Foochow and one from Formosa shipped at Amoy.

"Where are they manufactured and what is the range of prices?"—In Foochow and Tamsui the range of prices paid being from 5d to 1s 3d or 1s 4d for Foochow, and from 6d to 3s for Formosa. Many of the finest of the Formosas are sent to the London market.

"Could we in Ceylon mannfacture Oolongs that wonld give au average of say 1s per lb?"—To this I shonld answer decidedly, No!—since the average of the "Suey Kut" Oolongs, which would be more easily made, runs only about 9d per lb. if so much.

"Are 15 to 18 millions of Oolongs sold in America?"—A circular of the Foochow Chamber of Commerce dated 19th December last, gives the export of Oolongs to America from Foochow as 6½ millions, and the annual export of Formosa Oolongs would be about 12 to 14 millions.

"Conld Ceylon hope to displace say 5 or 6 millions of these Teas?"—I think that Ceylon conld certainly hope to place that quantity, provided the quality was right, and the average I have named—say 8d to 9d, a paying one.

"Are Oolongs artificially scented and is the process of scenting them difficult?"—So far as I know only the finer or finest kinds are scented. The process is not difficult or very expensive, provided the scenting flower is at hand.

"Can you tell us how it is done?"—The scenting flower is added in certain percentages to the Tea before final firiug. After the tea and flower have been left together for half or one day, they are fried or dried together and afterwards the flower is sifted out before the tea is packed.

"Is Formosa a country to which we should be likely to obtain admission in case of wanting to study the mannfacture of Oolongs?"—Anyone cau enter Formosa and visit the tea centres. A person so doing could doubtless pick up the process by watching, bnt as there are no inns or hotels in those parts, he would perforce be the gnest of one of the European firms engaged in the trade, and if they knew his purpose, they might do their best to thwart it, besides which, the guests attempting it would be placed in a very uncomfortable position.

"Is the crop of Green Teas going from Japan this year, due to labour difficulties or is it climatic?" I am unable to say, but should think it was mostly climatic.—"Are we likely to see a great fall in the price of Green Teas in America, supposing 15 to 17 millions were shipped this year from Ceylon and India?" I should say most certainly such an export would canse a reduction of possibly 3 to 5 gold cents per lb, (1½d to 2½d) unless the qnality so pleased as to throw the greater fall on to the Teas from Japan and China. "How do Ceylon greens compare with Japan and Indian greens? If the comparison is unfavourable to Ceylon, will not our teas suffer severely in the event of a large Japan crop?" I have not seen enough Ceylon greens to form an opinion. Those I have seen compare favourably with Japans and Chinas in leaf, but are, in my opinion, too thin in liquor. If the American verdict was the same and the

importations from Japan and China large, there would undoubtedly be danger of a severe fall in Ceylons—which could only be tided over by a liberal cess allowance, until the industry had hit upon the desired quality and colour. For information regarding the method of manufacturing Green Teas, I would recommend application being made to the English and German Consuls at Ningpo, in which district all Green Teas are grown and made. "In Western America beyond St. Louis, is there not still a large continent where Black Teas are consumed and where Ceylons are unknown?" Undoubtedly there are many large cities such as San Francisco and others within a radius of 1,000 miles (Chicago included) where Black Teas are largely used and where the "Thirty Committee" Commissioner has done little or nothing, (excepting at Chicago), but those markets have been and are being exploited by firms in Colombo having Agents there. More might be done by the means at the disposal of the "Thirty Committee" in the country indicated. There is one danger ahead which I would notice. Should the Export to London fall off and become lower than the requirements of that market, an opening would be given to China to send larger supplies of common Black Tea. China can increase or decrease that supply at will, witness the large increase during 1902, in the Export of Oolongs, which excess will have been made from the "Sucy Kut" Congon leaf by which the supply of Black Teas has been curtailed to the extent of 2½ millions of pounds. The fact also that the larger crop of Oolongs has been made out of the leaf usually converted into common Black Tea shows that the manufacture of Oolongs in Ceylon as well as Greens can be as well carried out on low-country estates as on those of high elevation.

FINAL.—In conclusion I would merely add that I have always been of opinion that the money expended by the "Thirty Committee" in the Eastern States in pushing Black Tea has been simply and absolutely wasted, and would have been of far greater use had it been applied to exploitation of the same Tea in Russia.

The Eastern States are the ones which use Oolongs and Green teas, and funds may, I think, still be employed in pushing them there advantageously. A great effort should be made at the St. Louis Exposition to bring Ceylon Greens and Oolongs into notice, whilst at the same time it can do no harm to show also Ceylon Black Teas.

It would be a great pity, I think, to discontinue the campaign in the Eastern States on behalf of Green Teas and Oolongs, as those are the kinds used by ⅞ths of the population of those States, and to cease the effort now would be to destroy what good has already been done.

I do not think that China will be able to compete with Ceylon as regards Black Teas so long as Europeans are prevented from holding land in the interior, and even should that privilege be eventually granted, it is a question how far the China leaf will lend itself to machinery.

The result of an experiment made at Foochow, where a small Factory with Jackson's machinery was erected, was a decided improvement in the appearance of the dry leaf, and a thicker liquor in the cup, but the flavour was destroyed, the taste being mawkish and dull, and the peculiar flavour, which the leaf tried, should have developed was entirely absent.

AMBEGAMUWA PLANTERS' ASSCIATION.

ANNUAL REPORT FOR 1902—1903.

In presenting this report for 1902 your Committee have pleasure in stating that the Association has well maintained its strength and usefulness during the past year.

The number of votes in the Register is 38, being one less than last year.

The financial position of the Association is as follows:—

	R.	c.
EXPENDITURE.		
Debit balance from last year... ..	2	95
38 Subscriptions at R7·50 to Parent Association	285	00
Petty Disbursements	124	47
	412	42
38 Subscriptions at 10	380	00
Leaving a debit balance of ..	R32	42

The accounts of the Association were duly audited by Messrs. Wiggin and Blacklaw.

MEETINGS.—During the year there have been five General Meetings, four meetings of the Standing Committee and four meetings of the Local Labour Federation Committee, all of which have been well attended.

MINOR ROADS.—The Inter-District Roads in the District are generally in good order. The District Road Committee grant for 1902 is R355.

A Resolution was passed at a General Meeting held on the 21st November, asking the District Road Committee to have the bridge across the ravine on Binoya Estate near Rozelle Station, put in permanent repair. And your Committee have pleasure in informing you that the matter has been taken in hand by the District Road Committee.

P. B. F. AND N. A. HATTON.—These funds have been well supported by the Association during the year.

CROP ESTIMATE.—The returns for the district for the official estimate of Tea Crop of 1903 were collected as usual.

The figures arrived at being as follows:—

a	Total acreage in Tea	..	16,026 acres
b	Acreage in bearing	..	14,752 ,,
c	Total tea crop	..	5,587,500 lb.
d	Estimate of Green Tea	...	660,000 ,,
e	Estimate of Native Leaf (included in *c*)	...	325,000 ,,
f	Acreage abandoned	..	24 acres
	The total tea crop being	...	388,500 lb.

less than last year's estimate, equal to a decrease of 22 lb per acre.

HOSPITAL AND DISPENSARY VISITORS.—On the recommendation of the Association Mr E H Hutchinson was appointed unofficial visitor to Watawala Dispensary.

OBITUARY.—Your Committee has with much regret to record the death of your late Chairman, Mr Oliver Collett who, on several occasions, occupied the office of Chairman and whose keen interest and ability in all Association matters were much appreciated by all.

PREDACEOUS INSECTS AND HOW THEY CATCH THEIR PREY.

THE GOVERNMENT ENTOMOLOGIST'S LECTURE.

The following is the full text of Mr. E. E. Green's lecture on Saturday, July 17th.

The subject of this lecture may perhaps be called a cruel one. Nature in many of her moods, *is* cruel,—from *our* standpoint. But in spite of her apparent cruelty—Nature is always interesting, if we will take the trouble to scrutinise her operations. It is said that every-one likes to know what his neighbour has for dinner. The most popular hour at the Zoo is when the animals are being fed. I propose, therefore, to introduce you to some of our common insects at their meals. I have purposely chosen my chief examples from insects that occur commonly in Ceylon, so that you may yourselves be able to watch their habits—if you wish—and perhaps to find out other interesting traits connected with them.

Insects.—In common with other animals—may be broadly divided into two groups,—Carnivorons and Herbivorous. The carnivorous insects may again be divided into those that prey upon living animals, and those that feed upon dead animal matter. The first of these divisions may be further subdivided into Predatory and Parasitic forms. It is with some examples of the first of these subdivisions that I shall concern myself tonight. And, more particularly, with such as have special organs of prehension for the capture of their prey. As typical examples of such insects, we may take the various species of Mantidae. I have here a slide showing a representative, but by no means complete, gronp of these insects. In several of them you can see the specialised front legs that will be described in detail presently. You will see tbat they vary considerably in size,—from this small species which is only three quarters of an inch in actual length to this elongated species that measures five inches from snout to tail. Our knowledge of the names of the various Ceylonese Mantidae is very incomplete, So I can refer specifically to a few only. This one, with the ocellated spots on its front wings, is called *Creobroter pictipennis*. It is really

A VERY PRETTY LITTLE FELLOW,

Its front wings are bright green with a gamboge-coloured eye-spot picked out in black, Its hind wings are delicately shaded with purplish grey. This bizarre-looking creature that appears to have bits of leaves attached to its elbows and knees rejoices in the appalling name of *Gongylus gongyloides*. The insect seems to be componnded of bits of twigs and fragments of leaves. But they are all really parts of its body. It is usually of a yellowish green colour, though individuals of a yellowish-brown tint are not uncommon. This form and colouration, while protecting the insect from the attacks of its enemies (birds, lizards, &c.), stands it in good stead in its own hunting operations. The term "hunting" is however scarcely applicable; for the Mantidæ do not usually chase their prey, but stationing themselves in some suitable situation, often near some tempting flower or fruit, they remain perfectly motionless but wide awake, awaiting the advent of some passing insect. The *Gongylus* takes advantage of its resemblance to foliage by establishing itself at the end of the spray of some plant—freqnently close to a flower. From thence it snatches butterflies and other winged insects. I have actually seen one of these Mantises catch a butterfly on the wing, as it was hovering over the flower. The undersurface of the expanded portion just behind the insects head is coloured a delicate pink, and may perhaps itself be mistaken for part of a flower,—a most fatal mistake for the insect that makes it. Observe this slender part between the head and the abdomen. The food must be bitten very small to allow of its passage down such pipe-stem waist.

THE "PRAYING MANTIS"

(*Mantis religiosa*) is so-called from the devotional attitude that it assnmes, its arms doubled and held up in front of face. Needless to say, its mental attitude is by no means devotional. As one writer has punningly remarked, instead of saying "Let us pray" (pray), it is more probably murmuring "Let us prey" (prey). Another remarkable form of Mantis is the *Chaeradodis squilla* which carries a green sunshade over its head. Not that it anticipates a snnstroke. The green shield is more probably for the purpose of disguise,—to make it look more rustic and innocent. The Mantis is one of the most rapacious and callous of insects. It will seize a grasshopper or any unwary insect that comes within its reach and—ignoring its struggles—will calmly eat off all the outlying portions before attacking the vital parts of its victim. It may possibly occasionally pick up some higher game, such as an infantile lizard or frog. I have vivid recollection of a tragedy that occurred in a vivarium in which I had a happy family consisting of several species of lizards and frogs. I rashly introduced a Mantis, one day, thinking that it would support itself on the flies and other small insects that were supplied for the other occupants. Next morning the cleaned skeleton of what had been a small green tree-frog testified to the dangerous nature of the newcomer, which was promptly removed and placed on a creeper in the verandah, where it afterwards itself fell a victim, being caught and devoured by a large green lizard. And now we must examine the special weapon with which the Mantis is provided. I have here a slide showing the front limbs of a small species. You will notice how well they are adapted for their purpose,—to seize and hold a struggling insect. The leg is divided into the nsnal parts. The greatly thickened portion is the femur—or thigh. The thickening is to strengthen the parts and to give attachment to the powerful muscles required for the gripping action. Its inner edge is armed with stont spines, like the teeth of a steel rat-trap. The other jaw of the trap is represented by the tibia or shin. It also has a double row of spines which interlock with those of the femur, and it terminates in a stont claw. The foot proper is represented by these small terminal joints which are usually turned back to be out of the way. They are not of much importance to the insect and are frequently missing, having been lost perhaps in a fight with a neighbour,—or perhaps accidentally eaten by the insect itself, which seems to get along very comfortably without them. This is what is called the raptorial type of leg. The other legs of the Mantis have homologous part, but they are slender and adapted only to walking. The Mantis is predatory throughout its whole life. The baby Mantis when first hatched from the egg, is possessed of these specialized front legs and knows how to use them. This slide shows a young *Gongylus* as it appears when it first steps out into the world. This same raptorial form of front leg occurs in a nnmber of different insects,—often in widely separated families. The Mantidae—just noticed—belong to the family *Orthoptera*, which inclnde the herbivorcns Leaf and Stick insects: the Locusts, Grasshoppers and Crickets: and the Cookroaches. It appears also in the Bug family (*Hemiptera*), the Net-winged family (*Neuroptera*) and amongst the 2-winged flies (*Diptera*). As examples of *Hemiptera* possessing

RAPTORIAL LEGS,

may be mentioned the *Emesa*, which looks like a very thin stick-insect, a veritable skeleton dude, and an allied genus, *Ploiaria*, which simnlates a small "Daddy-long-legs" (*Tipula*). These little bngs capture their prey in the same manner as do the Mantidae; but, while the latter have biting jaws and tear their food to pieces, the bugs have a sharp beak constrncted for sucking, and absorb the juices only of their victims. There are also aquatic bngs, *Ranatara* (sometimes called the "water-mantis"), the water-scorpion (*Nepa*), and the giant water-bug (*Belostoma*). This last insect is common in the Kandy lake, and probably in Colombo also. It measures nearly three-and-a-half inches in length and is proportionately stout. It preys upon small fish, frogs and tadpoles, as well as upon beetles and other terrestrial insects that tumble into the water, gripping them with its strong front legs and driving its cruel beak into their flesh. I have kept them alive in an aquarium for several months at a time, feeding them upon beetles, grasshoppers and cockroaches, the latter insects being especially appreciated. They have well-developed wings and frequently leave the water at night for a short flight. At such times they are often attracted by the electric lamps, and may be picked up in the road in a dazed condition. In the family *Neuroptera*, we have the *Mantispa*, showing the same form of raptorial limb. As its name implies, it resembles the *Mantis* in form and habits: but differs widely from that insect in the natnre of its development. A young *Mantis* is merely a diminutive edition of the adult insect minns its wings. But a young *Mantispa* undergoes a grub stage, and a remarkable grub stage too, for it undergoes what is

called hypermetamorphosis, that is it passes through more than the three normal stages of metamorphosis. When first hatched it is an active little creature with well-developed legs. But soon it settles down into the degraded condition of parasitism in the egg-cocoons of certain spiders, where it assumes the form of a fat fleshy grub and loses the use of its limbs. From thence it passes into the normal pupal stage, and eventually resumes active life as this delicate net-winged little insect that you see before you. It preys upon small flies, catching and eating them in exactly the same manner as does the true Mantis. We find the same form of limb recurring in the 2-winged flies (*Diptera*). It is very noticeable in that remarkable little species the "Telescope Fly" (*Diopsis*), so-called because its eyes are placed on stalk-like projections from the sides of the head. In this insect the femur of the front leg is armed with a row of sharp spines upon which the tibia closes. The *Diopsis* runs about on the leaves of plants in shady places and pounces upon smaller insects that happen to be exercising themselves in the same situations. In another group of flies, the *Empidae*, it is the hind legs that are modified for grasping, and in these we find a somewhat similar arrangement of the femur and tibia of the third pair of limbs. The *Empis* fly often pounces upon its victim and bears it along with it, taking its meal in mid-air. The big "robber flies" (Asilidae) catch and carry, their prey in the same manner, but use their feet only in holding it. Their legs are consequently without any special modification. These flies suck the juices only of their victims.

Amongst

THE WASP TRIBE

(*Hymenoptera*), grasping apparatus is found both on the front and hind limbs. Of the former type, the *Gonatopus* may be taken as an example. In this instance the prehensible apparatus is a modification of the claws of the front-leg to form a strong pair of nippers. This picture was made from a specimen caught by sweeping with a butterfly net amongst coarse grass. Although it figures so large on the screen, the *Gonatopus* is really a very minute insect, only a small fraction of an inch in length. The feeding habits of this insect are not known. In its larval stage it is a parasite on the bodies of small insects popularly known as "frog-hoppers," The eggs are laid on the body of the frog-hopper, and it is in holding on to these acrobatic little insects that the gripping apparatus of the *Gonatopus* is brought into play. In some other parasitic Hymenoptera, *e.g.*, *Stephanus indicus*—the hind limbs are modified in the same way as those of the Empis fly already described. This character is very well marked in a little wasp that breeds in the egg-cocoons of the common Mantis. It is a brilliant little insect with a burnished metallic green body. Its extravagantly long ovipositor is required to allow of the eggs being placed in position in the heart of the cocoon. But little is known of the feeding habits of these minute insects and it is uncertain whether this structure is employed for the capture of prey or solely for grasping the insects in which they wish to deposit their eggs. It can hardly be required for this purpose in the case of the insect that oviposits in the egg-cocoon. I must now bring to your notice some insects in which

THE MOUTH PARTS

are especially modified for reptorial purposes. One of the most remarkable of these modifications is the apparatus carried by the larvae of dragon-flies. The adult dragon-fly is well-known to all of you. One species is perhaps

THE COMMONEST INSECT IN COLOMBO

or, at any rate, the one most in evidence. No-one can have driven from the Colombo station to the Fort without being struck by the sight of the thousands of dragon-flies hovering in the air along the edges of the lake, or resting in long lines on the telegraph wires. The adult dragon-fly takes its food on the wing, its prey consisting of all sorts of smaller winged insects. Those dragon-flies that we see along the lake edge are doubtless growing fat on a plentiful diet of that troublesome Colombo pest of which we have lately heard so much—the Lake-fly. But perhaps very few of you have seen the insect in its larval stage, or would recognise it, if you did see it. The dragon-fly larva lives in the water and feeds upon worms and small aquatic insects, and perhaps picks up an occasional young fish. Some years ago I was present when the stew-ponds at Nuwara Eliya were emptied. Hundreds of young trout fry had been turned into the ponds some months previously: but they had completely and mysteriously disappeared. The drag-net brought up not a single troutlet. But it contained numerous ugly looking larvae which I identified as the grubs of one of our largest dragon-flies. I think it very probable that these larvae were responsible for the disappearance of the young fish. The dragon-fly larva has a broad head with prominent goggle eyes: six well developed jointed legs: and a body that is short and stout or long and slender—according to the species. But they may always be recognised by the presence—on the underside of the head—of an elbowed process, provided with a strong pair of forces at its extremity, and capable of being shot out in front to seize any desired object. Its application reminds one of the lazy-tongs used by our grandmothers to pick up pins or other small objects without rising from their seats. When at rest this apparatus is folded close against the underside of the head, the front part almost completely covering the face of the insect, on which account it is often referred to as the mask. I have here a photographic representation of a young dragon-fly larva with the apparatus retracted: another showing it fully extended: and a third giving a larger view of the head and apparatus itself. It would be difficult—without entering into minute technical details of the mouth-parts of insects in general—to explain the exact relations of this organ, and I will merely say that it consists of a modification of the lower lip (labium) and the chin (mentum) with the labial palpi. The dragon-fly larva is a very common insect and may be dredged up in a hand-net, from the bottom of any shallow pool or along the edges of the lake. It would repay anyone to keep one or two of these insects in a shallow vessel—such as a finger-bowl or soup-plate—to observe their habits. Drop a fly or a small worm into the water, at a little distance from, but within sight of the larva. You will see the latter creep stealthily towards the object until it is within striking distance, when the extensile pincers will be suddenly shot orward and the victim will be seized, pulled in and promptly devoured. Another most interesting insect—also a member of the family Neuroptera—is

THE APHIS-LION

(the larva of *Myrmeleo*). It is of special interest more from its habits than its structure. It has no extensile apparatus, nor does it run after its prey. It waits until its food actually tumbles into its jaws. To ensure this happy result, the ant-lion constructs small funnel-shaped pits in loose sand or fine earth, in spots sheltered from rain. The ground beneath the eaves of a bungalow or outhouse is an almost sure find for them. At the bottom of the pitfall lurks the little larva, its body completely buried, its head alone exposed—with the sickle-shaped jaws widely extended. There the little creature waits, patiently motionless, until some wandering ant falls headlong into the trap, when it is seized, dragged under the sand and sucked dry. If the ant escapes the first snap of the jaws and tries to climb the sloping walls of the pit, the shifting sand gives way beneath its feet and its discomfiture is completed by a volley of sand jerked at it by the concealed insect. A second tumble to the bottom usually results in its capture. The empty skin of the ant is finally jerked out of the hole and the trap repaired for the reception of the next

unwilling visitor. In this diagram I bave endeavoured to shew a section of one of tbe pitfalls. And here is a photograph of the insect removed from its den. If we examine the weapons with which it is provided, we find that each curved jaw is composed of two parts—the mandible and the maxilla—one of which slides in a groove cut in the face of the other. The two parts combine to form a tube through which the juice of the victim are absorbed. When fully grown tbe larva constructs a globular cocoon of sand and eventually emerges in the form here shown. It looks rather like a small dragon-fly, but the body is sborter in comparison to tbe length of wing, and it has clubbed antennae which are not seen in the true dragon-fly. The perfect insect may often be seen flying feebly round the lamp at night, or resting—in the daytime—on the verandah walls. An allied insect witb similarly constructed jaws is

THE "APHIS-LION"

—a name given to the larvae of the lacewing flies (*Chrysops and Hemerobia*). This larva—as you may see from its picture—covers its body with the empty skins of its victims, and walks about—a veritable "wolf in sbeep's clothing"; though its covering is really more for protective than aggressive purposes, for its victims—the Aphides—are sluggish insects and quite incapable of resisting or escaping from their rapacious enemy. Aphides—as you doubtless know—are the small green or brown plant-lice that crowd upon the young shoots of roses and many other plants. The Aphis-lion calmly establishes itself on the edge of the crowd, picks up Aphis after Aphis, sucks it dry and neatly, adds its empty skin to the trophy of scalps carried on its back. These habits, though unpleasant for the aphis, are of great service to the agriculturist. I have here a photograph of the little animal—un-robed. Mosquitoes are not usually looked upon as friends of man. But we have one species—the largest and most brilliantly coloured representative of the family in Ceylon—that may fairly claim that title; for its larva is carnivorous and feeds entirely upon other mosquito larvae. Its scientific name is *Toxorhynchites immisericors*. It is common in the Peradeniya Gardens, where it particularly frequents tbe clumps of Giant Bamboo. I have recently been studying its life bistory—which was bitherto unknown. It breeds in the water that accumulates in the hollow stumps of the bamboo. Though it is popularly termed the 'elephant mosquito,' I think that title must have been gained more on account of its comparatively large size than from its ferocity. I have never been bitten by one myself, and have met only one person who professes to have experienced the bite of this species. In the adult stage, it feeds principally on fruit. I have kept specimens alive in captivity and have watched them sucking the juice of plantains. I have freely offered them my arm on the chance of their wanting a change of diet, but they have never availed themselves of my kindness, though other captive mosquitoes have not been so forbearing. The carnivorous larva of this species carries a remarkable raptorial organ on its head. In the larva of the common mosquitoes [illegible]eles, there is a pair of brush-like [illegible] front of the head which—by a rapid lashing movement—create a current in the water wbich brings the suspended food to their mouths. They are termed "whorl organs." In the larva of our *Toxorhynchites* these delicate whorl organs are replaced by two groups of sharp curved hooks, opposing each other. With this apparatus it seizes the smaller larvae of other mosquitoes when they incautiously approach within reach, and bolds them firmly while they are being devoured. It is a sluggish insect and progresses through the water with difficulty by a series of awkward contortions. But it does not require any great activity. There is a super-abundance of this commodity on the part of its prey: for the other mosquito larvae are constantly jerking themselves about in the water, and—in the confined space of a bamboo stump—are sure, sooner or later, to run up against the apparently torpid larva of *Toxorhynchites*. In an instant the hooks—which ordinarily lie back on each side of the head—are closed upon the victim. It seldom misses its stroke.

IN THE ANT TRIBE

we bave an example of predatory insects that hunt in packs. Tbey migbt be called the wolves of the insect world. The fierce "Red Ant" (*Œcophylla smaragdina*) scours the country in tbe neighbourhood of its nests, communicating with its fellows by means that we do not properly understand. With their strong jaws they can overpower quite large caterpillars and other soft-bodied insects. I have recently had bitter experience of the rapacity of another large ant (*Myrmicaria subcarinata*), when a horde of these insects found tbeir way into one of my breeding cages and tore to pieces a number of full-grown silk worms. There is a comparatively small but very active reddisb ant, named *Plagiolepis gracilipes*, whose acquaintance you may often have made in your sugar basins. Tbough decidedly fond of sweets, this species is really very useful in the house, for they are the sworn foes of cockroaches. I have on several occasions watched a cockroacb-hunt conducted by these ants. The cockroach, as it hurries across the floor in search of cover, is surrounded by a cloud of skirmishers. They never attempt to grip their quarry. Their aim appears to be to dash in and give a quick bite at tbe sensitive antennæ of the cockroach and dart back again. Tbey must secrete some very subtle poison, for after one or two tiny wounds, the cockroach turns over on its back in a paralysed condition, wben the skirmishers close in and drag away their victim to their nest. This sugar ant is remarkable for its ability to overcome more formidable species of the same tribe, though unprovided with any apparent weapon of offence. Its jaws are small and weak, as you can see from tbis enlarged photograph of its head. Yet it defeats, in single combat, the ferocious Red Ant whose jaws are powerful enough to cut it in half at a single stroke. It pursues the same tactics just noticed in the description of the cockroach-hunt. Some ants make their hunting excursions in orderly array, like an army, and apparently bave recognised signs or words of command—imperceptible to our senses. Of this type is that elongate shining-black ant (Lobopelta species) which is possessed of a powerful sting. I was once watcbing an army of these ants. They were travelling in column—some 4 or 5 deep. Suddenly the leading files halted; tbe rest of the column closed up, till they were all packed together in a dense mass—one above tbe other. Wben the last straggler was in his place, tbe secret signal was given, and a combined dash was made to a large fallen leaf lying in the drain. I had seen nothing suspicious about this leaf. But doubtless one of tbe scouts of tbe black army had brought word tbat a large and succulent worm was concealed beneath it. As soon as it found itself discovered, the worm—which was of a slippery and active sort—commenced a violent series of jerks and twists in its endeavour to escape. But soon its entire surface was hidden beneath the thickly clustering ants, and a hundred stings had been plunged into its body. In less time than it bas taken me to describe the episode, a procession had been formed and tbe limp corpse of the worm was being conveyed back to head quarters. But if I were to attempt to describe the remarkable habits of ants in general, I should be wandering from my proper subject, and I sbould keep you here all night. My allotted time and your patience must both be exhausted. The ways of ants would form a sufficient subject for a separate lecture. It only remains for me now to tbank you for the kind patience with which you have listened to my somewhat discursive remarks upon predatory insects.

Correspondence.

To the Editor.

LUCERNE; AND PAPAYA: QUESTIONS FROM FAR PARAGUAY.

Ascension, Paraguay, Nov. 21, 1902.

Dear Sirs,—Can you advise me of any remedy for slugs that destroy alfalfa (Lucerne)? I have had the leaves eaten off twelve acres by these pests, and no one here seems to know of a remedy; so I hope you will kindly be able to suggest one in the next number of the *Tropical Agriculturist.* I should also be obliged by your advising me if the milk of the paw-paw has any commercial value, and if so, how it should be prepared for export?—Yours truly,

C. T. M. FEATHERSTON.

Casilla de Correo 63.

[As to the first question, Mr. E E Green is good enough to write:—"The best remedy appears to be dusting the plants thickly with lime—or spreading it on the surface of the ground surrounding the plants."—As to the milk of the papaw, there is a great deal of information in past numbers of the *T.A.*, and our correspondent should see that a "set" of the volumes is filed by the Paraguay Government, or in a local Public Library, for ready reference.—Ed. *T.A.*]

THE NEW MEDICINE FOR MALARIAL FEVER.

London, Jan. 1.

Dear Sir,—I enclose you today an exact copy of a letter I have received from one of the correspondents who read my report in the *Ceylon Observer.* As I only received the letter today, I do not send you the original because I am having some printed copies made of it for distribution in the United States, where they suffer so frightfully from malarial fever, and it was Dr. Beling of the New Jersey State Hospital who first worked at it for malaria in that country. I am sending him out a copy of the report.—I remain yours faithfully,

THOS. CHRISTY.

Prospect Cottage, Bures, Suffolk, Dec. 31, 1902.

Thos Christy, Esq., Dear Sir,—I called at your office on the 25th November, and you were good enough to let me have a bottle of Cassia Beareana. I began on the 26th to take 20 drops in plenty of cold water once a day. I have done so daily, and have kept perfectly free from ague and fever. I find it stimulates and strengthens my nerves, clears my brain, and in fact, I may say, it is many a long day since I have enjoyed such a month of perfect health—no low, morbid feelings, but bright and cheerful; a free and easy feeling as if I had power to hold myself erect. I cannot sufficiently express my gratitude to you for writing to the *Ceylon Observer*; otherwise I might not have heard of this cure. I intended going to Liverpool to see Dr. Ross. I have sent a pamphlet and an account of the effect Cassia Beareana has had upon myself, to Dr. Wontersz, Govt. Doctor at Nuwara Eliya, as it was by his advice I came home. I only hope he will try it in the hospitals.—I remain, dear Sir, yours truly,

(Sgd.) MARION EDLEY.

REJECTED TEAS FROM MELBOURNE: ACCEPTED IN LONDON.

Melbourne, Jan. 3.

Dear Sir,—Some prominence was given just before the holidays to the fact that some of the teas, which were not allowed to enter this port, when released and sent to London, were allowed not only to pass in there, without difficulty, but were pronounced by the broker who had charge of them, to be of good quality. It was remarked that "the justice and promptitude shown in London compared very favourably with the harshness and long delay experienced in Melbourne."

I enclose you an extract from the *Age* of Jan. 2nd, reviewing the tea trade for 1902 and also alluding to the position of the

REJECTED TEAS.

[We give the tea "review" on page 556.—Ed. *T.A.*]

GAME PROTECTION IN PERAK.

Ceylon Game Protection Society, Jan. 20.

Dear Sir,—I thank you for your kindness and courtesy in sending me the portion of the Perak Government Gazette on the subject of game protection in the State of Perak. It seems to me that Protection there is to be on a far more extensive scale than in Ceylon and that the fines to be imposed for breaches of the ordinance are far heavier.—Yours faithfully,

THOMAS FARR,

Hon. Secretary, C. G. P. S.

POINTS FROM THE GREEN TEA DEADLOCK IN CEYLON: FOR CESS PAYERS TO CONSIDER.

Jan. 20.

Dear Sir,—There are one or two points in the green tea deadlock that are worth pointing out to the payers of the cess, who make good teas in connection with the appeal for a further increase of the cess.

I. What class of teas will benefit most by a reduction of exports to the London market? Teas for price.

II. Will good teas improve in values? On past experience—hardly at all.

III. What do these two facts point to? They show pretty clearly that with improved values for "teas for price" it will pay better to pluck coarse upcountry than fine. It has been done in the past and will be done again.

IV. What will the effect of this be? It is very clearly shown in brokers' reports and the recent telegrams to Kandy from the London Association.

Consequently I feel compelled to ask proprietors of estates making good teas to hesitate and carefully consider the position

and not rashly agree to a proposal which will hardly benefit them in the slightest and may prove most harmful to our industry as a whole.

As one making good teas myself, I consider any increase of the cess as a form of the worst "class legislation" because the proposers cannot show that it is for the good of the whole. Past experience shows us this cannot be the case.—Yours faithfully,

INCOG.

CEYLON EXPORTS OF COCONUT OIL TO INDIA.

Colombo, Jan. 22.

DEAR SIR,—A few days ago, in an article on Exports for last year with comparisons with previous years, you enquired why Export of Coconut oil to India had dropped off so much, as that country used to be about the best customer of Ceylon. The reason, I understood, to be that an import duty was imposed; which made this an unpaying business to the Chetties who were almost the sole exporters of oil from here to India, and so the business has nearly died out.—Yours faithfully,

JAMES GIBSON.

COMB HONEY IN COLOMBO.

Colombo, Jan. 22.

DEAR SIR,—I send you a sample of comb honey from an improved bee-hive I am working.—I am, Sir, C. D.

[We can testify that the comb is very well filled with superior honey of good flavour.—ED. *T.A.*]

PLANTING NOTES.

A BACTERIOLOGICAL INSTITUTE IN SIAM.—It is stated in the *Semaine Medicale* that in order to give France a manifest proof of its friendly feeling, the Siamese Government has decided "to create at Bangkok a bacteriological institute to be under the exclusive direction of French physicians, and to institute forthwith in connexion with the health department, a service of sanitary works, having at its head a French engineer, and reinforced by engineers, also French."—*British and Colonial Druggist*, Jan. 9.

A REVIEW OF THE AUSTRALIAN TEA TRADE—during 1902 will be found in our daily of today. Traders there have had an adverse year and the causes which are named as having depressed the market, will be read with interest. "Colombo continues to be the main source of supply," the report states, although the imports this year are fully 10 per cent less than last year. Ceylon too has gained ground over India in the past year, the quality of the latter's tea being disappointing. China teas are gradually dropping out. Notwithstanding the fact that stocks are very much reduced the outlook for the year is characterised as poor.

CARDAMOM CULTIVATION: THE CESS CIRCULAR.

The following is the letter that has been addressed to cardamom growers in Ceylon:—

Rangalla, Jan. 12.

Dear Sir,—A Sub-Committee (consisting of Messrs. J Westland, J A Spence, W Reeve Tatham and myself,) appointed by the Committee of the Planters Association of Ceylon, to inquire into the best methods of pushing the sale of Cardamoms in foreign countries, recommend that the following circular be sent to all Cardamom growers with a view to ascertaining what support will be given. To enable the Committee to lay this matter before the Planters Association Meeting to be held on 17th February, an early reply is requested.—Yours faithfully, WILLIAM SINCLAIR, Chairman, Sub-Committee.

Circular.

That in view of the large extension in Cardamom Cultivation whereby the supply in the near future is likely to exceed the demand, it is most desirable that means should be adopted to make this product better known in foreign markets. To allow of this being done funds are necessary. It is therefore proposed that all cardamom growers be asked to subscribe 50 cents per cultivated acre, to form a fund for the purpose of pushing and making better known this product.

(Signed) WILLIAM SINCLAIR, J. WESTLAND, J. A. SPENCE, W. REEVE TATHAM, Sub-Committee.

A NEW RUBBER VINE.

The U S Consul at Tegucigalpa (Honduras) has been informed of the discovery in the Pijo mountains of a vine growing in an uncultivated state which is said to produce rubber of excellent quality. The vines grow to 100 feet in length, varying in diameter from 4 in. to 2 feet, and they are said to belong to the African family of rubber vines. In Honduras, no one seems to know the name of the vine or the botanical family to which it belongs. The discoverer (Senor Davadi, Governor of the Department of Comyagua) regards it as superior in quality to the Para rubber of commerce, and asserts that his convictions are borne out by the analyses made by American and European chemists.

The vine thrives at great altitudes as well as in the lower valley levels. Such luxuriance of growth has this plant attained that it is quite capable of being cut in commercial quantities. It may be quickly propagated in the rich soil of the Department by means of seedlings, and the growth being so much faster than that of rubber trees, Senor Davadi thinks the quantity of gum obtained would be large. The trees require six years' attention before sapping can begin. It has been proposed to form a company for the exploitation of rubber in the Yoro district, but though the names of several prominent men have been connected with the enterprise, nothing has as yet been done to begin operations.—*Commercial Intelligence*, Jan. 10.

DUMONT COFFEE COMPANY.

A circular has been issued stating that the coffee crop for the current year, owing to the trees having borne a very heavy crop last year which was followed by a severe drought, has fallen considerably below the manager's estimate of 60,000 cwt, the yield only amounting to 4,265, cwt, against 143,395 cwt in 1901. The market price of ordinary Santos coffee has averaged 28s 9d per hundredweight since the selling season began, but the average price realised to date on 15,702 cwt sold on the company's account is 40s 3d per hundredweight. Owing to the unsatisfactory harvest and the low price of coffee, the directors regret no further distribution can be made at present on account of arrears of preference dividends.—*H. and C. Mail*, Jan, 2.

QUININE AND CINCHONA.

Speculation in quinine has again been on a smaller scale this year, the shellac-market having overshadowed it to a great extent, and the latter has proved a more remunerative article. There has been practically no inducement to speculate for a rise in quinine, as the bark-shipments from Java up to November have again been extraordinarily heavy, even out-distancing the figures for 1901. So far the total shipments from January to November have been ;—

1900	.. ..	9,680,000 Amst, lb.
1901	.. ..	11,499,000 do.
1902	.. ..	12,028,000 do.

These figures have completely nonplussed the "outside" market, and various theories have been propounded to account for them. Rumours of a combination among the Java planters have been hinted, and that the output was to be restricted, but as each successive month saw heavy shipments such rumours were naturally discredited. Taking the average unit paid for bark at Amsterdam, we find it is the lowest for the past three years. In January it opened at 7.45c., advancing at three consecutive auctions to 8.65c in May (the highest point), when makers quoted 1s 3d. From this period there was a gradual decline to 4.90c. in August, when makers reduced quinine to 10½d. In August the unit rose to 6.80c, and subsequently declined to 6.25c. this month. There have been fewer fluctuations in makers' quotations, and they close 1d per oz. lower than in January. The top price was 1s 3d (from April to June), but at the end of the latter month a reduction of 2d was made, and by September it was down to 10½d. It was barely a fortnight at this figure, for before the end of the month it stood at 1s 1d, and another ½d added in October brought it up to 1s 1½d.—to-day's price. In the "outside" market spot values close about 2½d lower than at the commencement of the year. The highest price paid was 1s 2d in March and the lowest 9¼d in September, when the makers quoted 10½d. This low figure was merely temporarily, however; and with everybody wanting to buy there was a gradual advance to 1s ½d by the end of the month. From that point it went down to 10¾d in November, and although the market subsequently advanced to 11¼d, the position has an element of weakness in it.—*Chemist and Druggist*, Dec. 27.

COCONUT OIL MEAL.

The coconut palm (*Cocos nucifera*) is found throughout the tropics, and large quantities of the nuts are exported from the West Indies, Ceylon, West Africa, the Pacific Islands etc. Jamaica in 1900 exported coconuts to the value of £41,000 whilst Trinidad's annual output is from twelve to fourteen million nuts, worth about sixteen thousand pounds. The kernel of the nut contains a high percentage of a valuable oil, which is largely used for cooking, illuminating, etc., and as the source of 'nucoline' or coconut butter utilised as a substitute for lard and butter in cooking (see *Agricultural News*, page 53).

Professor A H Church, F R S, in his book on *Food* records the following analysis of the fresh kernel of the coconut :—

	In 100 parts.	In 1 lb. oz.	gr.
Water ..	46·6	7	200
Albuminoids, etc.	5·5	0	385
Oil ..	35·9	5	325
Sugar, etc. ..	8·1	1	130
Cellulose ..	2·9	0	203
Mineral matter	1·0	0	70

The nutrient ratio of this kernel is 1·16. The fresh nut, it will be seen, contains nearly thirty-six per cent of oil, in addition to eight per cent of sugar and 5·5 per cent of albuminoids. In the ordinary process of manufacture the greater part of the oil is extracted and a residue obtained known as coconut oil cake. This substance in common with several other 'cakes' obtained from oily seeds such as cotton seed, linseed, groundnut, etc., has a high nutritive value.

The following analysis of coconut oil cake are taken from a paper from Mr M E Jappa, *Report, Agricultural Experiment Station*, California, 1895-96, page 113. As a basis of comparison the mean of three analyses of linseed oil cake (compiled from data in the same paper) are also reproduced,

Coconut Oil Cake.

	First sample.	Second sample.	Linseed oil cake. (Mean of three analyses).
Moisture	12·87	14·68	10·72
Pure ash	4·54	4·27	4.67
Crude protein	20·06	19·16	29·55
Crude fibre	11·50	8·55	8·24
Nitrogen free extract [Starch, Sugar, etc.]	40·90	42·81	36·73
Crude fat	10·13	10·53	10·07

The author remarks : 'coconut oil cake meal is another much valued concentrated food, and is finding more favour every year with the dairymen of California. While not rating as high in flesh formers as either linseed or cotton seed meal, it appears in many cases to be more relished by the animals.' Professor W A Henry in his recently published book, *Feeds and Feeding*, gives a summary of an interesting experiment made by the French War Department as to the value of coconut meal for horses. 'The results proved that coconut meal was equal and even superior to the same weight of oats.'—Barbados *Agricultural News*, Dec. 6.

COCONUT EXPORTS CALCULATED IN NUTS.

In our article on page 551, we dealt with the volume and the destination of the principal products of the coconut palm sent out of the island during last year. It has been usual with us to calculate what these exports represent in nuts, in our annual review of the Chamber of Commerce Circular; and the calculation has been found useful both by Ceylonese and by the Europeans who are becoming interested in growing numbers in the coconut industry. The bases of our calculations have been challenged; but absolute accuracy cannot be expected in dealing with averages. The size and weight of nuts differ so widely in different districts, and even in the same district, and also on the same estate at different seasons and from different fields, that one can only use approximate averages. It may be that a closer approximation than ours, of 500 coconuts to a cwt of oil, 250 nuts to a cwt of copra, and three nuts to a lb. of desiccated kernel, may be worked out after consultation with the Managers of the various oil and desiccating mills, and the large owners of chekkus; but as our calculations for several years have been based on the above-named proportions, we adhere to them for purposes of comparison, leaving our readers to vary the computation according to the data within their reach.

Of oil, which continues to absorb the largest number of our coconuts, we sent away last year 512,498, or the equivalent of 256,249.000 nuts, being the largest quantity ever sent to the crushing mills if we except 1892, when the exportation of 550,977 cwt of oil worked out to 275,488,500 nuts. The 374,796 cwt of copra exported last year—the quantity was exceeded by 65,000 cwt in 1901 and by 132,000 cwt in 1898—represents, at 250 nuts to the cwt, 93,699,000 nuts. The record quantity of 16,227,565 lb. of desiccated coconut stands, at three nuts to the lb., for 48,682,695 nuts, or more than half the quantity absorbed for copra! We were certainly unprepared for the result at which we have arrived; and it is proof, both of the excellence of the stroke that was made, when extraction of the moisture of the coconut kernel, while retaining its flavour for purpose of confectionery, was hit upon, and also of the enterprise with which the business has been conducted, that an industry only a dozen years old should be following so close on the heels of copra which was an article of export for generations. But the manifold uses of copra in Europe are of recent discovery, and even as late as 1895, the quantity exported represented only about 26 million nuts, a quantity which desiccation may double during the current year! If we add to the above totals for last year the 12,588,212 coconuts in the shell-exported, we get a grand total of 411,218,907 nuts, or the largest quantity ever sent away. Last year the total exceeded 393 millions, but 1898 (the record year for copra) held the pre-eminent and the influence of the growth of the copra trade and of desiccated kerne may be gauged from the fact that in 1892, the year when we sent away almost 100,000 cwt of oil more than in any succeeding year, the exports calculated in nuts barely exceeded 330 millions. There is one other remark that we have to offer, suggested by the unprecedentedly large quantity of poonac that was exported last year, that its exclusion from our calculations is not quite justified. True, it is the refuse of the copra after oil has been extracted from it; but on the computation of 250 nuts to a cwt of copra, and 3 cwt of copra to 2 cwt of oil, every cwt of poonac should represent the refuse of 750 nuts; but the oil representing 500 nuts, the balance 250 nuts, must be shown in the poonac. In this way, the 247,697 cwt of poonac exported last year must be held to represent 61,924,250 nuts, and would help to raise the grand total to 473,143,157 nuts.

The export figures for the last five years work out as under, and we have added those for 1892, the year for the heaviest exportation of oil, for purposes of fuller comparison:—

	Oil cwt.	Copra cwt.	Dessicated lbs.	Coconuts.
1902	512,498	374,796	16,227,565	12,588,212
1901	453,531	439,865	14,055,493	14,850,781
1900	443.959	362,467	13,604,913	14,995,909
1899	400,979	325,401	13,571,084	11,723,392
1898	435,933	505,277	13,040,534	12 027,714
1892	550,977	134,590	3,849,724	9,717,386

	Oil Nuts.	Copra Nuts.	Desiccated Nuts.	Grand Total including nuts value.
1902	256,249,000	93.699,000	48,682,695	411,218,967
1901	226,765,500	109,966,250	42,166,479	393,749,016
1900	221,979.500	90.616,750	40,814,713	368,406.898
1899	200,489,500	81,350,250	40,713,252	334,276,394
1898	217,966,500	126.569,250	39,121,602	395,685,066
1892	275,488,500	33,647,500	11.549,172	330,402,558

We have excluded the poonac as it does not appear in our tables for the earlier years.

DISCOVERY OF ASBESTOS AND MICA IN VIRGINIA.—Dispersed over a district of 5,000 acres, various asbestos fibres of a thickness of 1½ ft. to 3ft. were discovered. It furthermore appeared that at greater depths (very probably on account of the dampness), the quality of the asbestos is better, without losing its thickness. For the purpose of exploiting these asbestos and mica layers, under the style of the American Asbestos, Co., a company with a capital of 1,000,000dol. has been started, which has secured the concession for the working of a district 4,000 acres wide, and situated about twelve miles south of Bedford. The prices of asbestos in the United States vary between 10dol. and 750dol. per ton, according to the quality and length of the fibre. The resources of the United States of America hitherto consisted of only one asbestos field, otherwise they had to depend on Canada and Europe. The discovery of these new asbestos fields therefore, is of immense importance, especially as the demand for this material is continually growing. As a similar demand for mica is also apparent in the United States, the new discovery is also very important in that respect.—"Manufacturer's Record" in "Gummi-Zeitung,"—*India-Rubber Journal*, Jan. 5.

CAMPHOR.

The exports of champhor oil from Japan to various countries from 1899 to 1901 were as follows :—

	1901		1900		1899	
	Quantities.	Value.	Quantities.	Value.	Quantities.	Value.
China	1525	366	386	62	136315	13578
France	25800	3650	—	—	10140	912
Germany	6494	785	83910	17523	297100	36373
Great Britain	17384	2334	44412	8853	68129	5482
Hong-Kong	849663	134400	104990	17012	241581	25556
U.S.A	660842	98325	216570	37753	346387	34404
Other countries	262	71	705	147	274	45
Total	1561970	239931	450973	81350	1100226	116352

[Kin=1·3 lb ; Yen=2*s* 0½*d.*]

The exports of camphor from Japan to various countries from 1899 to 1901 were as follows :—

	1901		1900		1899	
	Quantities.	Value.	Quantities.	Value.	Quantities.	Value.
Australia	23344	32903	41559	47723	12589	12284
Belgium	—	—	8990	8027	116100	71230
British America	16007	26158	4808	6123	1503	1421
British India	512762	552398	187670	208290	126720	96582
China	82502	64389	16374	13895	18217	9863
France	211612	183722	33008	29510	271	257
Germa'y	627310	532770	87760	64117	287624	192634
Great Britain	899067	949722	358021	429412	47514	29489
Hong-Kong	891565	750603	1141516	1017807	1497114	939219
Philippines	2503	3354	11016	10731	—	—
U.S.A.	896278	810420	1388706	1238971	648588	399276
Other countries	2307	3102	1287	1789	2385	2287
Total	4165757	3904969	3280715	3070695	2758625	1754492

[Kin=1·3 lb ; Yen=2*s* 0½*d*]

—*Chemist and Druggist*, Jan. 3.

INDIAN AND CEYLON TEA SHARE VALUES.

IMPROVEMENT MAINTAINED.

From the following figures, compiled by Mr George Seton, of the Indian Tea Share Exchange, it will be seen, says the *Financial Times*, that the market value of the forty-five representative companies registered in the United Kingdom, which had recently risen considerably, remains virtually the same. There have been a good many moderate rises in value, but these have been counteracted by reductions in value, in a few cases of considerable extent. In a few cases, however, dividends have been deducted since the figures were last computed :—

Face value of 45 companies		..	£9,500,000
Market Value	July 1, 1897	(highest point)	£12,000,000
do	Jan. 1, 1902	..	7,000,000
do	July 1, 1902	...	6,225,000
do	Sept. 1, 1902	(lowest point)	6,050,000
do	Oct. 1, 1902	..	6,150,000
do	Nov. 1, 1902	..	6,300,000
do	Dec. 1, 1902	..	6,600,000
do	Jan. 1, 1903	...	6,600,000

As the total share and debenture capital of the one hundred and seventy companies altogether registered in the United Kingdom amount to nearly £19,000,000, the fluctuations of the entir volume based on the above figures, may be thu estimated :—

	£
Face value of (about) 170 English companies	19,000,000
Highest market value, July 1, 1897 ...	24,000,000
Lowest market value, September, 1 1902	12,100,000
Present market value, Jan. 1, 1903, say	13,250,000

This shows a depreciation of, altogether £10,750,000, or of nearly 45 per cent from top-point. Even these augmented figures it may be observed, take no account of the many private-owned estates nor of the Calcutta, Madras, Bombay and Colombo companies, registered with rupee capitals—the total amount of which it is difficult to compute, but in which the depreciation has doubtless been at least as great.

Mr. Seton adds that it appears probable that the advance, amounting to about 10 per cent., which has taken place since September, is now likely to stop there for a little, until it can be estimated, with some degree of accuracy, how the results of working for the year 1902 are likely to pan out, which can scarcely be sooner than the end of February in the case of the Ceylon companies, and March or April for the Indian companies.—*H & C Mail*, Jan. 16.

RUBBER GRASS OR BARK.

A foreign subscriber to *The India-rubber Journal* is very desirous of finding out the names of the firms who are importing from Mexico a grass or bark containing rubber. We shall be extremely pleased if any of our subscribers can help us with information on this matter.—*India rubber Journal*, January 5.

PLANTING NOTES.

Planting in Dominica—100,000 fertile acres, 60,000 seedlings of tropical products delivered to planters in one year, the necessity of having at least £15,000 capital—these are some of the leading facts set forth in the interesting letter we quote tonight, from the Administrator of the Island of Dominica, —which is in area 300 square miles. A previous letter has fetched a number of settlers and Dominica is now a land of much promise.

The Balata Industry in Dutch-Guinea.—The industry is restricted as to place and tapping by strict official orders. In spite of the unfavourable condition of trade during the first five months of 1901, the number of firms enjoying concessions has increased, and, as prices remain satisfactory, everything seems to point to a renewed future of balata. The yield of 1901 has been about the same as in 1900, the Nickerie district alone giving 145,000 kilos. The greatest danger to the industry lies in the killing of the trees through irrational tapping by the workmen. In order to gain the greatest possible quantity of balata, the tree is often not tapped on one side only, as officially wished, but on both sides, which causes it to die off; very often the trees are even felled.—*India Rubber Journal*, Jan. 5.

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company	paid p. sh.	Buyers.	Sellers.	Transactions.
Agra Ouvah Estates Co., Ltd.	500	—	—	...
Ceylon Tea and Coconut Estates	500	..	...	—
Castlereagh Tea Co., Ltd.	100	—	100	..
Ceylon Provincial Estates Co. Ltd.	500	550	—	550
Claremont Estates Co., Ltd.	100	—	...	..
Clunes Tea Co., Ltd.	100	65	80	—
Clyde Estates Co., Ltd.	100	50	60	—
Doomoo Tea Co., of Ceylon Ltd.	100	..	—	...
Drayton Estate Co., Ltd.	100	—	...	—
Eila Tea Co., of Ceylon, Ltd.	100	..	40	40
Estates Co of Uva, Ltd.	275	—	300	—
Gangawatte Tea Co., Ltd.	100	—	—	—
Glasgow Estate Co., Ltd.	500	1150	..	..
Great Western Tea Co., Ltd.	500	—	—	250
Hapugahalande Tea Estate Co.	200	150	....	...
High Forests Estates Co., Ltd	500	—	550	..
Do part paid	400	—	..	10
Horrekelley Estates Co Ltd	100	115	..	...
Kalutara Co., Ltd.,	500	200	250	200
Kandyan Hills Co., Ltd	100	..	.	—
Kanapediwatte Ltd.	100	—	—	—
Kelani Tea Garden Co., Ltd.	100	..	32·50	...
Kirklees Estate Co., Ltd.	100	..		—
Knavesmire Estates Co., Ltd.	100	..	50	—
Maha Uva Estates Co., Ltd.	500	—	—	—
Mocha Tea Co., of Ceylon, Ltd.	500	—	800	800
Nahavilla Estate Co., Ltd.	500	250	300	...
Nehoda Tea Co., Ltd.	500	—	—	...
Palmerston Tea Co., Ltd.	500	—	400	—
Penrhos Estates Co , Ltd.	100	—	80	..
Pitakanda Tea Company	500	—	—	—
Pine Hill Estate Co., Ltd.	60	—	—	—
Putupaula Tea Co., Ltd.	100	—	..	—
Ratwatte Cocoa Co., Ltd.	500	—	—	—
Rayigam Tea Co., Ltd.	100	—	55	55
Roeberry Tea Co., Ltd.	100	90	95	—
Ruanwella Tea Co., Ltd	100	30	—	...
St. Heliers Tea Co., Ltd,	500	..	—	—
Talgaswela Tea Co., Ltd.	100	25	30	—
Do 7 per cent Prefs.	100	—	70	—
Tonacombe Estate Co., Ltd,	500	—	400	—
Union Estate Co., Ltd.	500	..	...	—
Upper Maskeliya Estates Co., Ltd.	500	575	...	—
Uvakellie Tea Co. of Ceylon, Ltd	100	—	85	...
Vogan Tea Co., Ltd.,	100	..	55	55
Wanarajah Tea Co., Ltd.	500	800	—	—
Yataderiya Tea Co., Ltd.	100	..	375	370

CEYLON COMMERCIAL COMPANIES

Company	paid p. sh.	Buyers.	Sellers.	Transactions.
Adam's Peak Hotel Co., Ltd.	100	..	30	—
Bristol Hotel Co., Ltd.	100	—	97½	—
Do 7 per cent Debts	100	..	—	—
Ceylon Gen. Steam Navigation Co., Ltd	100	..	225	—
Ceylon Ice & Cold Storage Co. Ltd.	100	110	—	107½
Ceylon Superæration Ltd.	100	—	—	—
Colombo Apothecaries' Co. Ltd.	100	—	147½	147½
Colombo Assembly Rooms Co., Ltd.	20	15	.	...
Do prefs.	20	...	..	...
Colombo Fort Land and Building Co., Ltd.	100	..	90	—
Colombo Hotels Company	100	—	300	300
Galle Face Hotel Co., Ltd.	100	185	...	185
Kandy Hotels Co., Ltd.	100	130	135	—
Kaluganga Nav. Co. Ltd.	70	..	—	—
Mount Lavinia Hotel Co., Ltd.	500	—	300	..
New Colombo Ice Co., Ltd.	100	60	70	70
Nuwara Eliya Hotels Co., Ltd.	30	25	27½	..
Do 7 per cent prefs.	100	—	—	—
Public Hall Co., Ltd.	20	...	—	...

LONDON COMPANIES

Company	paid. p. sh.	Buyers.	Sellers.	Transactions.
Alliance Tea Co., of Ceylon, Ltd.	10	...		
Anglo-Ceylon General Estates Co	100	—	52-57	—
Associated Estates Co., of Ceylon	10	...	1½—2½	—
Do. 6 per cent prefs	10	—	3—6	—
Ceylon Proprietary Co.	1	—	3—6	—
Ceylon Tea Plantation Co., Ltd.	10	—	22½—23½	—
Dimbula Valley Co. Ltd	5	—	5—5½	—
Do prefs	5	—	5—6	—
Eastern Produce & Estate Co. Ltd.	5	—	3¼—3¾	—
Ederapolla Tea Co., Ltd	10	—	5—8	—
Imperial Tea Estates Co., Ltd.	10	...	4½..	—
Kelani Valley Tea Assen., Ltd.	5	—	3—5	—
Kintyre Estates Co., Ltd.	10	..	4-5	—
Lanka Plantations Co., Ltd	10	—	3-4	—
Nahalma Estates Co., Ltd.	1	—	nom	..
New Dimbula Co., Ltd.	1	—	2¾—3	...
Nuwara Eliya Tea Estate Co., Ld	10	—	10	
Ouvah Coffee Co., Ltd.	10	—	6½—7½	—
Ragalla Tea Estates Co., Ltd.	10	—	9-11	—
Scottish Ceylon Tea Co., Ltd.	10	—	10—12	—
Spring Valley Tea Co., Ltd.	10	—	2—5	—
Standard Tea Co., Ltd.	6	—	9¾—10¼	..
The Shell Transport and Trading Company, Ltd.	1	— ..	2⅞—3⅛	— —
Ukuwella Estates Co., Ltd.	25	—	par	—
Yatiyantota Ceylon Tea Co., Ltd.	10	—	5¾	—
Do. pref. 6 o/o	10	..	9—9¼	—

BY ORDER OF THE COMMITTEE.

Colombo, Feb. 6th, 1903.

* Latest London Prices

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor General*

	1898.	1899	1900	1901	1902	Av. of 33yrs.	1903.
	Inch	Inch.	Inch.	Inch.	Inch	Inch.	Inch.
January ..	2·32	·98	3·72	11·91	1·95	3·46	4·16
February ..	1·98	2·78	0·63	3·55	4·57	2·02	0·00*
March ..	4·21	0·88	3·71	5·12	6·85	4·52	
April ..	22·81	6·66	15·12	8·71	10·01	11·30	
May ..	5·80	17·73	10·63	6·28	11·89	11 86	
June ..	10·94	9·23	7·83	5·93	9·84	8·32	
July ..	6·15	1·11	6·77	4·52	4·63	4·46	
August ..	0·97	0·62	7·35	0·46	2·78	3·66	
September ..	6·90	1·48	4·00	3·93	8·18	5·04	
October ...	20·60	12·99	9·47	3·91	31·47	14·56	
November ..	17·38	8·58	9·25	19·84	20·10	13·00	
December ..	3-05	4·44	5·20	1·70	6·43	6·56	
Total..	103·11	73·48	83·68	75·86	118·70	88·76	4·16

* From 1st to 4th Feb. 0 inches, that is up to 9-30 a.m on the 5th Feb.—Ed. *C.O.*

CEYLON TEA: MONTHLY SHIPMENTS TO UNITED KINGDOM AND ESTIMATE.

Estimate	for	Jan.	1903—9½ to 10 mill. lb.
Total	Shipments	Do	1903— 8,000,000 lb.
Do	Do	Do	1902— 9,056,013 lb.
Do	Do	Do	1901—12,617,540 lb.

[Estimate for Feb. 1903—7½ to 8 million lb.]

The Director, Government Cinchona Plantations, Madras—in his Budget for 1903-04, makes provision for the purchase of sufficient bark to yield 12,000 lb of sulphate of quinine, which together with 3,000 lb of sulphate of quinine, from estate barks will bring the total output to 15,000 lb. The cost of the purchased bark will depend on the price of the unit. The number of units to be purchased is 1,200,000 and estimating the price of the unit at 1⅝d the sum required will be R1,31,250.—*M. Mail*, Feb. 2.

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

EXPORTS

Colombo, Feb. 2nd, 1903.

CARDAMOMS :—
All round parcel, well bleached per lb. R1 20
Do. dull medium do. R1·00
Special assortment, 0 and 1 only do R1·40
Seeds do. R1·00

CINCHONA BARK :—
Per unit of Sulphate of Quinine 7c—1½ to 3 per cent.

CINNAMON :—(in bales of 100 lbs. nett.)
Ordinary assortment per lb. 50c.
Nos. 1 and 2 only per lb. 56c,
Nos. 3 and 4 only per lb. 41½c.

CINNAMON CHIPS :—(in bgs. of 56 lbs. nett. per candy of 560 lb.) R62·50

COCOA :—
Finest estate red unpicked per cwt R45·00
Medium do do do R40·00
Bright native unpicked and undried R35·00
Ordinary do do do R30·00

COCONUTS—(husked)
Selected per thousand R55·00
Ordinary ,, R46·00
Smalls ,, R37·00

COCONUT CAKE—
Poonac in robins f. o. b. per ton R80·00
Do in bags none.

COCONUT (Desiccated).
Assorted all grades per lb 18c.

COCONUT OIL—
Dealers' Oil per cwt R15·62.
Coconut Oil in ordinary packages f. o. b. per ton R352·50.

COFFEE.—
Plantation Estate Parchment on the spot per bus. None
Plantation Estate Coffee f. o. b. (ready) per cwt.—R62·00.
Native Coffee, f.o.b per cwt.—None.

CITRONELLA OIL—
Ready do per lb.—56c.

COPRA—
Boat Copra per candy of 560 lb. R49·50
Calpentyn Copra do do R52 00
Cart do do do R45·00
Estate do do do R52·50

CROTON SEED per cwt—R11·00

EBONY—
Sound per ton at Govt. depot None—Next Sale on 30th March.
Inferior None—Next Sale on 30th March.

FIBRES—

Coconut Bristle	No 1	per cwt	None
Do	,, 2		None
Do mattress	,, 1		None
Do	,, 2		None
Coir Yarn, Kogalla	,, 1 to 8		R16·50
Do Colombo	,, 1 to 8		R12·00
Kitool all sizes			None
Palmyrah			None

PEPPER—Black per lb None

PLUMBAGO—

Large lumps	per ton	R550 00
Ordinary lumps	do	R550 00
Chips	do	R350·00
Dust	do	R225 00
Do (Flying)	do	R125·00

SAPANWOOD— per ton R45·00

SATINWOOD (Sound) per cubic ft. R5·90—Sale of this day
Do (Inferior) per cubic ft. R4·40— do
Do (Flowered) per cubic ft. R10·70— do

TEA—	High Grown Average	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	57	44	36
Orange Pekoe do	48	42	34
Pekoe do	43	36	29
Pekoe Souchong do	36	30	27
Pekoe Fannings do	33	30	27
Broken mixed—dust, &c	28	25	25

CEYLON EXPORTS AND DISTRIBUTION FOR SEASONS 1902 AND 1903.

COUNTRIES	Black Tea 1903 lbs.	Black Tea 1902 lbs.	Green Tea 1903 lbs.	Green Tea 1902 lbs.	Coffee—cwts. Plantation	Coffee—cwts. N'tive	Coffee—cwts. Total	Cocoa cwts.	C'moms lbs.	Cinnamon Bales. lbs.	Cinnamon Chips. lbs.	Coconut Oil. 1903. cwts.	Coconut Oil. 1902 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac. cwts.	Coconuts. No.	Plumbago. 1903 cwts	Plumbago. 1902 cwts.
To U K.	6175508	6851329	93448	2405	386	..	386	5949	28588	42788	46 28	26740	8572	800	657043	997	276025	4743	11019
,, Austria	5138	65	...	...	..	..	..	..	..		34500	2217	1209	...	8350	...	..	...	...
,, Belgium	825	7169	...	..	...	...		20	...		5600	834	...	69	...	7006	26910	618	872
,, France	14086	16589	...	...	..	—	..	10	...		16800	..	...	100	...	...	..	204	...
,, Germany	56887	49566	.	...	...	.		271	6160	31711	22400	513	20	9568	72700	6057	31720	2722	2144
,, Holland	..	...	..		...	..	..	...	...	..	...	..	...	...	...	..	..	..	...
,, Italy	2939	520	...	..	..	..	...	...	..	5000	..	212	607	...	..	..	..	...	...
,, Russia	312930	612958	...	..	...	...	..	...	...	..	..	..	...	5000	—	..	..	...	..
,, Spain	...	500	..	..	...		...	...	..	21300	8400	.	...	...	11650	..	...	...	...
,, Sweden	6308	10655	..	...	...	..	..	..	..	..	..	...	...	...	3250	..	...	..	...
,, Turkey	1975	4016	..	...	...	..	..	...	..	..	...	..	...	..	...	...	..	..	..
,, India	68094	43498	...	...	...	..	...	...	158	..	..	1586	298	...	...	..	..	114	114
,, Australia	1036550	526824	..	...	47	...	47	50	...	...	2240	...		..	33323	...	..	..	..
,, America	447460	96841	265348	...	..	.	...	100	...	4000	..	2505	499	...	76500	...	...	14811	...
,, Africa	10369	28714	...	...	...		..	..	...	...	..	..	...	..	..	..	130330	..	...
,, China	354710	140222	..	..	...	...	..	..	1700	...	..	201	...	..	.	..	..	..	304
,, Singapore	15738	7337	...	..	...	...	..	304	...	...	..	..	..	..	...	...	..	...	..
,, Mauritius	5582	960	...	..	...	..	...	..	..	..	..	...	...	..	..	...	...	..	..
,, Malta	18835	7000	..	..	...	...	..	...	..	...	..	..	..	..	...	..	...	...	..
Total export from 1st Jan to 2nd Feb. 1903.	8533964	8404635	358796	2405	433	..	433	6974	52286	140799	136268	34808	11205	15537	862816	14060	465035	23212	14453

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Price Current, London, 14th January, 1903.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ..	70s a 80s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
ARROWROOT (Natal) lb.	Fair to fine ..	7d a 8d
BEES' WAX, cwt.		
Zanzibar & Bombay { White ,,	Dingy to Fair	£5 a £6 12s 6d
Yellow ,,	Fair ,,	£6 a £6 17s 6d
Madagascar ,,	Dark to good palish	£6 5s a £6 17s 6d
CAMPHOR, Formosa ,,	Crude and semi-refined	160s a 175s
Japan ,,	Fair average quality ..	170s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	1s 8d a 1s 10d
	Middling, stalky & lean	1s a 1s 4d
Ceylon.—Mysore ,,	Fair to fine plump ..	1s a 3s 3d
	Seeds .	1s 4d a 1s 5d
,, Tellicherry ,,	Good to fine ..	1s 6d a 2s
	Brownish .	1s 3d a 1s 6d
,, Long ,,	Shelly to good ..	9d a 2s
,, Mangalore ,,	Med brown to good bold	2s 8d a 2s 11d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	2¼d a 2½d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	31s a 40s
CINCHONA BARK.—lb.	Ledgeriana Orig. Stem	6d a 9d
Ceylon	Crown, Renewed	5d a 7d
	Org. Stem	2½d a 6½d
	Red Org. Stem	2½d a 4½d
	Renewed	3d a 5¾d
	Root	3¾d a 4d
CINNAMON, Ceylon 1sts	Ordinary to fine quill	8½d a 1s 6d
per lb. 2nds	,, ,,	8d a 1s 6d
3rds	,, ,,	7½d a 1s 4d
4ths	,, ,,	7d a 11d
Chips	,, ,,	2½d a 10d
CLOVES, Penang lb.	Dull to fine bright bold	5½d a 1s
Amboyna ..	Dull to fine	5d a 6d
Zanzibar and Pemba }	Good and fine bright	4⅜d a 4½d
	Common dull to fair	4d a 4 5-16d
Stems ..	Fair	2d
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	92s 6d a 118s
	Middling to fine mid ..	80s a 105s 6d
	Smalls	55s a 62s
Native	Good ordinary	40s a 50s
Liberian ,,	Small to bold	30s a 40s
COCOA, Ceylon ,,	Bold to fine bold	65s a 85s
	Medium and fair	58s a 64s
	Native	50s a 57s
COLOMBO ROOT ,,	Middling to good	10s a 20s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair ..	£13 10s a £18
FIBRE, Brush ,	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£20 a £24
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £30
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	15s a 25s
CUTCH ,, ,,	Fair to fine dry	25s a 30s
GINGER, Bengal, rough ,,	Fair	40s
Calicut, Cut A ,,	Good to fine bold	80s a 85s
B & C ,,	Small and medium	46s a 60s
Cochin Rough ,,	Common to fine bold	36s a 40s
	Small and D's	32s a 35s 6d
Japan ,,	Unsplit	33s a 34s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	10s a 35s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £16
	Part yellow and mixed	£7 a £10
	Bean and Pea size ditto	£70 a £8 15s
	Amber and dk. red bold	£5 15s a £8
	Med. & bold glassy sorts	90s a £7 17s 6d
Madagascar,	Fair to good palish ...	£4 a £8
	,, ,, red ...	£4 5s a £7 10s
ARABIC E. I. & Aden ,,	Ordinary to good pale	25s a 37s 6d
Turkey sorts ,,		27s 6d a 32s 6d
Ghatti ,,	Pickings to fine pale ...	12s a 27s 6d
Kurrachee ,,	Good and fine pale ...	27s 6d a 30s
	Reddish to pale selected	10s a 25s
Madras ,,	Dark to fine pale ...	18s a 25s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	45s a 75s
	Ord. stony and blocky	9s a 37s 6d
KINO ,,	Fair to fine bright	4d a 6d
MYRRH, picked ,,	Fair to fine pale	75s a 120s
Aden sorts ,,	Middling to good	65s a 90s
OLIBANUM, drop ,,	Good to fine white	42s a 47s 6d
	Middling to fair	28s a 42s
pickings ,,	Low to good pale	18s a 26s
siftings ,,	Slightly foul to fine	18s a 23s
INDIARUBBER, Ceylon	Fine (grwn. fr. Para seed)	2s 8d a 4s 4d
Assam	Good to fine	2s a 3s
	Common to foul & mxd.	7d a 1s 9d
Rangoon	Fair to good clean ...	2s a 3s
Borneo	Common to fine	6d a 2s 6d

	QUALITY.	QUOTATIONS.
INDIARUBBER (Contd.)		
Java, Sing. & Penang lb.	Foul to good clean ...	8d a 3s
Mozambique ,,	Good to fine Ball ...	2s 6d a 3s 2d
	Ordinary to fair Ball ...	2s a 2s 4d
	Low sandy Ball ...	9d a 2s
	Sausage, fair to good ..	3s 2d
	Liver and Livery Ball ..	1s 9d a 2s 8½d
Nyassaland	Fair to fine ball ..	2s 3d a 3s 3d
Madagascar	Fr to fine pinky & white	2s a 2s 6d
	Fair to good black ..	1s 1d a 2s 3¾d
	Niggers, low to fine .	7d a 2s
INDIGO, E.I	Bengal—	
	Shipping mid to gd violet	3s 8d a 4s
	Consuming mid. to gd.	3s 2d a 3s 7d
	Ordinary to mid.	2s 8d a 3s 1d
	Mid. to good Kurpah	1s 9d a 2s 3d
	Low to ordinary	1s a 1s 7d
	Mid. to good Madras	1s 4d a 1s 10d
MACE, Bombay & Penang	Pale reddish to fine	2s a 3s 6d
per lb.	Ordinary to fair	2s a 2s 9d
	Pickings	1s 7d a 1s 11d
MYRABOLANS, } cwt	Dark to fine pale UG	5s a 6s
Madras }	Fair Coast	4s 3d a 4s 6d
Bombay ,,	Jubblepore	4s 6d a 6s
	Bbimlies	4s a 7s
	Rhajpore, &c.	3s 6d a 5s 6d
Bengal ,,	Calcutta	3s 6d a 5s
NUTMEGS— lb.	64's to 57's	3s
Bombay & Penang ,,	110's to 65's	1s 1d a 2s 9½d
	160's to 115's	6d a 1s
NUTS, ARECA cwt.	Ordinary to fair fresh	14s a 17s
NUX VOMICA, Bombay	Ordinary to middling	5s 6d a 6s
per cwt. Madras	Fair to good bold fresh	7s a 10s
	Small ordinary and fair	5s a 6s 9d
OIL OF ANISEED ,,	Fair merchantable	4s 9d a 4s 10½d
CASSIA ,,	According to analysis	3s 3d a 3s 6d
LEMONGRASS ,,	Good flavour & colour	5¼d
NUTMEG ,,	Dingy to white	1¼d a 2½d
CINNAMON ,,	Ordinary to fair sweet	3¼d a 1s 1d
CITRONELLE ,,	Bright & good flavour	9d a 10½d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody..	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ...	10s a 14s
	,, wiry Mozambique	10s a 11s
PEPPER—(Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ...	6d a 6¼d
Singapore ...	Fair	6¼d
Acheen & W. C. Penang	Dull to fine	5½d a 5⅝d
PLUMBAGO, lump cwt.	Fair to fine bright bold	30s a 35s
	Middling to good small	20s a 28s
chips	Dull to fine bright ..	9s a 15s
dust	Ordinary to fine bright	4s a 7s 6d
SAFFLOWER	Good to fine pinky ..	65s a 75s
	Inferior to fair .	40s a 60s
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£15 a £30
Chips ,,	... ...	£5 a £8
Madras, Logs ,,	Fair to good flavour ..	£15 a £30
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Ceylon ,,	Fair to good ..	£5 a £5 10s
Manila ,,	Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth...	£7
SEEDLAC cwt.	Ord. dusty to gd. soluble	117s 6d a 120s
SENNA, Tinnevelly lb.	Good to fine bold green	5½d a 8d
	Fair greenish	3½d a 5½d
	Common dark and small	1¼d a 3d
SHELLS, M. o'PEARL—		
Bombay cwt.	Bold and A's	
	D's and B's	48s a 130s
	Small ...	
Mergui ,,	Small to bold ..	£7 15s a £10
Mussel ,,	Small to bold ...	17s a 55s
TAMARINDS, Calcutta...	Mid. to fine bl'k not stony	8s a 10s
per cwt. Madras	Stony and inferior ..	4s 6d a 6s
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	18s a 24s
TURMERIC, Bengal cwt.	Fair ...	12s 6d
Madras ,,	Finger fair to fine bold bright	10s a 14s
Do. ,,	Bulbs ..	9s
Cochin ,,	Finger .	10s a 12s
	Bulbs ...	9s a 9 6d
VANILLOES— lb.		
Mauritius ... } 1sts	Gd. crysallized 3½ a 8½ in	7s 6d a 28s 6d
Bourbon ... } 2nds	Foxy & reddish 3½ a 8 ,,	6s a 13s
Seychelles 3rds	Lean and inferior ...	4s 3d a 8s
VERMILION lb.	Fine, pure, bright ...	3s a 3s 1d
WAX, Japan, squares cwt	Good white hard ...	54s a 55s

THE
AGRICULTURAL MAGAZINE,
COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for February :—

Vol. XIV.] JANUARY—FEBRUARY, 1903. [Nos. 7 & 8.

A USEFUL CEYLON DRUG.

WHAT is known as extract of Jambul is sold by chemists as a specific for diabetes, but few people are aware how familiar a tree yields this drug.

"Jambul" is an Indian name for *Eugenia (Syzygium) Jambolana*, the black plum commonly known as "Ma-dan."

The following information (taken from Dr. Watt's Dictionary) regarding the medicinal virtues of the tree are of interest :—

"The bark is astringent and used in cases of dysentery and the decoction as a tooth-gargle. A vinegar, prepared from the juice of the unripe fruit is an agreeable stomachic and carminative; it is also used as a diuretic. The fresh juice of the bark is given with goat's milk in diarrhœa in children. The expressed juice of the leaves is used alone or in combination with other astringents in dysentery. The powdered seeds have had the reputation in recent years of being useful in the treatment of diabetes."

It is in this last connection that the tree appears to have received recognition in medicine as the source of a useful drug, and we read in the report of a Surgeon of the Indian Medical Department that the powder of the dried stone certainly does diminish the quantity of sugar in the urine very quickly, and, in some cases, even permanently.

We thus see that a familiar tree, commonly found on the sandy soils about Colombo and in the Negombo district, and the seeds of which are a favourite wild berry among children, yields a valuable drug. As a fruit the "black plum" is by no means of a high order, and beyond being consumed *in situ* by children who go a-blackberrying, it is seldom seen within doors except, occasionally prepared, as a sort of sweet salad with lemon juice and sugar, in which form its bright red dye makes it a more attractive looking than it really is. There is an idea that this preparation is wholesome and tends to purify the blood. Apart from this use of this berry, which is the chief food of the pompadour pigeon (bata-goyiya) and the use of the bark as a tanning agent, the plant is not considered as a particularly useful member of the myrtle order, to which it belongs together with such fruit-producing trees as the rose-apple, Malay apple, guava, &c.

Mr. W. A. de Silva, who has an extensive knowledge of the uses of our indigenous plants, says of this tree :—"I heard some years ago that the seed of Ma-dan was exported to Europe, and that the fruit was a specific in diabetes." This was no doubt the time that products of the tree began to be examined as medicinal agents.

We are aware that there is a local European firm greatly interested in the commercial development of our neglected vegetable products, particularly those of a medicinal character, and we have no doubt that we shall hear of more of such products appearing under new names and in new and commercial forms among marketable commodities.

The pity is that some of the members of the local medical department, which counts men of acknowledged scientific skill among its numbers,

do not turn their attention to the study of the medicinal virtues of Ceylon plants, when so much can be done through the technical knowledge they possess, to develope the vegetable resources of the island.

OCCASIONAL NOTES.

We have had enquiries as to the English equivalents of the Indian weights in connection with the treatment of cattle, referred to in Indian works. We, therefore, give below the equivalents in avoirdupois weight.

1	Tola..	..	$6\frac{102}{175}$ drs.
5	Tolas	1 chittack	$2\frac{2}{35}$ oz.
16	Chittacks	1 seer	$2\frac{2}{35}$ lbs.
40	Seers	1 maund	$82\frac{2}{7}$ lbs.
$27\frac{1}{4}$	Maunds		1 ton.

According to the *Chemist and Druggist* plants are able to take up arsenic when it occurs in the soil or the manure, and may be present in measureable quantities in the early stages of succulent growth, but in no case is the faintest trace of arsenic found in the fruit or seed of any plant, so that there would appear to be a selective power in plants by which the arsenic, even if present, is rejected from the reproductive organs. Still, there is the possibility of arsenic being consumed where vegetables are eaten in the green state as is lettuce, water cress, and the like.

Professor Marshall Woodrow, late of the Indian Botanical Service, gives the following as the probable Etymology of "Jak," *Artocarpus integrifolia*, in the *Gardeners' Chronicle*:—"That appellation was probably given by our early voyagers from the resemblance between its top outer covering, studded with raised points, and the Jack Coat-of-arms used by soldiers in mediæval times, and it is more probable that after months of salt pork and beef, our sailors enjoyed the rather fulsome flavour of the massive fruit, and gave it the name most familiar to them."

Another Ramie fibre boom is predicted as a result of the invention of the "Faure" decorticator described as a strong and cheap machine suitable for hard work on plantations, and working economically and effectively. The Ramie Congress held in Paris last year passed it as being all that is required. A large demand is expected for decorticated fibre, and the cultivation of the plant is advised. The American and French Governments are pressing its cultivation hard. So writes Mr. H. A. Carter of Manchester to *Capital.*

The comparative strength of our common fibres is given in the following table, from the results of several experiments with a three-strand one-eighth inch cord:—

	lb.
Cocos Nucifera stood a strain of	244
Hibiscus Cannabinus ...	... 290
Sanseviera Zeylanica ...	... 316
Gossypium Herbaceum ...	... 346
Agave Americana ...	... 362
Crotalaria Juncea ...	... 467
Calotropis Gigantea ...	... 552

Sterculia rupestris is the name of the so-called "bottle tree" of Australia, where the stem is said to be invaluable as a fodder during drought. The tree is allied to our Telambu (*S. fœtida*) and Nava (*S. Balanghas.*)

The Japanese system of well boring would appear to be as desirable an introduction to Ceylon as to India. The Kazusa or artesian wells of the Japanese, by which they carry on the whole of their rice cultivation, amounting to tens of thousands of acres, are sunk to great depths at a comparatively trifling cost. A complete working outfit for sinking is calculated to cost about Rs. 200.

The last Veterinary Journal contains the report of the Director of the Pasture-Institute, Annam, on the Epizootic among cattle in the Malay Peninsula. The conclusions arrived at by M. Carrongean are: (1.) The Epizootic is not rinderpest, but bovine pasteurellon or hæmarrhagic septicæuria. (2.) It is manifest in three principal forms: (*a*) subacute or septicæuric, (*b*) acute, with various local modifications, (*c*) chronic. 3. They are all due to the same microbe, viz., an ovoid organism of the germ pasteurella. (4.) The microbe varies in virulency. (5.) The possibility of preventive inoculation is hopeful. M. Carrongean says that the pseudo-rinderpest destroys more buffaloes than oxen, whereas in true rinderpest the reverse is the case, a large percentage of buffaloes recovering. He mentions Younger, Galtier and Nocard as confirming this view, and quotes the last author to the following effect: "A disease that destroys a large number of cattle and but few oxen is not true rinderpest."

According to the *Lancet*, the substance known as Sericin, which forms 20 per cent of mulberry silk and gives to silk material its peculiar and delightful character, has been formed by synthesis; and in this way an important step towards the artificial manufacture of silk has been made.

The *Times of India* has an interesting letter on the Sewage question and the various methods of treating sewage. We learn that the manufacture of poudrette, or night soil mixed with ashes is carried on by a number of Mofussil Municipalities. At Poona the industry brings in an annual income of half a lakh of rupees. At other centres the application of night soil direct to the land in deep or shallow trenches on the Meagher system has been found to answer satisfactorily, and in part of the N. W. the use of

common sullage water of the city has enormously increased the value of land. But the discovery of the bacteriological treatment of sewage has opened out a new field for the Engineer and the practical agriculturist, and the system is being adopted at the Matunga Leper Asylum in Bombay by Mr. C. C. James of the Municipality, who has proved that not only can a high degree of purification be brought about by a very small outlay, but that the resultant effluent is of great manurial value.

Mr. George Weerakoon, Mudaliyar, writing for a fruit of the cho-cho, says:—"I grew the plant 15 years ago, and at one time had several vines bearing no end of fruit. I got it from Hakgala Botanic Gardens, but I do not see the plant in these parts (Matara district). The tender fruit makes an excellent pickle not unlike the English cucumber. Even the leaves are eaten in the form of a *mellum*."

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF DECEMBER, 1902.

1	Monday	·30	17	Wednesday	Nil
2	Tuesday	·72	18	Thursday	Nil
3	Wednesday	·48	19	Friday	Nil
4	Thursday	·87	20	Saturday	·48
5	Friday	·50	21	Sunday	·46
6	Saturday	1·66	22	Monday	Nil
7	Sunday	·05	23	Tuesday	Nil
8	Monday	·10	24	Wednesday	Nil
9	Tuesday	·17	25	Thursday	Nil
10	Wednesday	·10	26	Friday	Nil
11	Thursday	·85	27	Saturday	Nil
12	Friday	Nil	28	Sunday	Nil
13	Saturday	Nil	29	Monday	Nil
14	Sunday	Nil	30	Tuesday	Nil
15	Monday	Nil	31	Wednesday	Nil
16	Tuesday	Nil	1	Thursday	Nil
				Total...	6·44
				Mean ...	·20

Greatest amount of rainfall registered in 24 hours on the 6th December, 1902, 1·66 inches.

Recorded by Alex. Perera.

CATTLE AND THEIR FOOD.

Mr. George Weerakoon, Mudaliyar of the Wellabodde Pattu, referring to our remarks with reference to fodder for cattle writes:—"According to the Administration Reports for 1901 there have been 210 cases of cattle stealing in the district, and the Magistrate remarks that prosecutions are uncommon for the reason that cattle are intentionally allowed to stray by their owners. The Government Agent of the Province recommends as a remedy that owners should combine and kraal their cattle. Of the 50,150 head of cattle in the district, a large number are the property of poor villagers who are obliged to drive their animals abroad to find their own food as the owners have none to give them. If kraaling be resorted to, the question arises, how are the animals to be fed?

The straw from the two paddy crops of the year is of course available, and if carefully harvested and stored it keeps well and forms an excellent fodder to fall back on. But, I would suggest that every cattle owner should provide himself with a small extent of grass land laid down preferably under Guinea grass, which is a wonderfully fast growing crop and spreads rapidly. It is known as "ginigiressa," and though (like "Uguressa," *Flacourtia Ramontchi*,) is considered indigenous is really an introduction, no doubt, as its name implies, from Guinea. The scientific name of the grass is *Panicum maximum*."

Guinea grass (also called "Rata-thana" in Sinhalese) is highly valued in India as a food for milch cattle, and is also the chief cattle fodder upcountry. But wherever there is low damp land the cultivation of Mauritius or water-grass should never be overlooked. We have supplied planting stock for cultivation under irrigation in Poona, and are also making a point of introducing it into places where it does not exist, through the agency of School Gardens. The last application is for seed, which it is not easy to procure, for growing in the Gold Coast.

Guinea grass and Mauritius grass are our only cultivated fodders, and when commercially grown under favourable conditions are a source of considerable income to many. Indeed, Guinea grass in the Kandy district and Mauritius grass in the Colombo district are bringing in large revenues to grass farmers.

We have already referred to the different varieties of plants and trees that might be made use of in times of scarcity, but we should like to make some reference to the preservation of grass, which, during the rains, yields a supply of produce larger than the existing demand, so that the total available stock of grass food may be distributed more equally than at present.

Here are some very simple directions how to make good dry grass or hay:—Grass for stacking should always be cut when green and in flower, not later, as then the nutriment in the stalks and leaves will have been exhausted in the production of the fruit. The most convenient and easy method of preparing grass stalking is as follows:—

Cut when green and in flower, tie up in bundles of about 8 to 10 lb. weight and place three of such bundles on their broad ends leaning against each other; by this arrangement the grass will not become damaged by rain, and the central grass of each bundle will ferment and acquire nutritious properties from forming saccharine and starchy matter.

When the bundles are sufficiently dried they may be stacked. Dry grass thus prepared will be found very nutritious and sweet, and animals will eat it readily. It will be nearly as good as the hay made in England and other countries. Proper hay-making requires much practical experience.

If the weather is hot, and sun powerful, grass will be dry enough, as a whole, in 2 or 3 days, and can be then stacked, but it should be stacked in

small ricks, in case of any heating taking place, for if grass be stacked when too green or wet, it will surely heat too much and go beyond the fermenting process of making sugar &c., and will take fire.

A *little* heating makes the grass sugary and gives a very sweet odour, the odour of hay.

THE NEW CURE FOR MALARIA.

The plant affording the root used as the remedy is a small tree from 20 to 30 feet high and having a trunk of 6 inches diameter at full growth. It has been named *Cassia Beareana*, and is therefore one of the leguminosæ, As used in East Africa by the natives, the root is chopped into pieces, each about an inch long, and about a dozen pieces are boiled in a gallon of water for half an hour or so. The result is a red coloured fluid which is partaken of by the patient, either hot or cold, as often as he feels thirsty. Under ordinary circumstances a tea cup full is given every couple of hours. A pamphlet of notes by Dr. O'Sullivan Beare, Vice-Counsul in East Africa, gives full details of the medical virtues of the new drug. We have already written for seeds of the plant, and are also hoping to receive a sample of the fluid extract of the root. Anyone desirous of reading the pamphlet referred to (a reprint from the *Lancet*) could have the loan of it on application to us.

Mr. Thos. Christy of Old Swan Lane, writing to us under date 8th September, regrets that he has no seeds of *Cassia Beareana* to send us, and adds that he has made a consignment of the Fluid Extract to the Colombo Apothecaries Company. This will enable local practitioners to give the new cure a good trial, particularly at places like Kurunegalle, Anuradhapura, and other malarious climes.

LIME AND ITS RELATION TO AGRICULTURE.

This is the subject of a useful paper in the Journal of the Department of Western Australia for December, by Mr. Percy Wicken. That the benefits of lime are little recognised in Ceylon is well known, and of late we have been pleased to have enquiries as to the use of the different forms of lime from more than one land owner, and it is for their benefit and for the information of the rest of our readers that we would quote from the article referred to above.

Lime, as most people know, is the product of burning various substances containing it, such as limestone, shells, coral, etc.

Good limestone contains from 50 to 55 per cent. lime. Such limestone, when burnt, produces the best quality of caustic or quicklime, containing from 90 to 98 per cent of the pure substance. Fresh lime, when removed from the kiln, will weigh from 90 to 95 lb. to the bushel, and when slaked, will make about 3 bushels in volume. Magnesian limestone or dolomite (which is found in Ceylon) varies much in composition, containing from 20 to 80 per cent of the carbonate of lime. The average of such limestone will produce a lime which contains from 70 to 85 per cent of lime, and weighs 75 to 85 lb. per bushel. In slaking the lime will make 2 bushels for one by volume.

Oyster shells contain from 90 to 95 per cent carbonate of lime, and will produce a comparatively pure lime which should contain from 85 to 95 per cent of the pure substance. Fresh burnt oyster shells weigh about 60 lb. per bushel, and slaked so to make 2½ bushels for one by volume.

The quantity of lime taken up by a heavy crop may vary from 101 lb. in a crop of cereals to 90 lb. in the case of a leguminous crop such as clover. This requirement is provided in a great many soils. But it is the chemical effect of lime that gives it its value making plant food already in the soil readily available, through its action in decomposing the mineral matter in the soil. It also hastens the decomposition of organic matter and promotes the formation of nitrates from the humus present. The presence of lime is necessary for the life and action of the nitrifying ferments. After green manuring, it is specially valuable. We thus learn that lime is not a substitute for, but a reinforcement of, manure, and it should be borne in mind that the use of lime must be supplemented with fertilizers.

Lime is of great value where land has an acid reaction, due to the presence of excess of decomposing organic matter yielding organic acids—a condition most noticeable on low wet lands.

The easiest way to determine the need for lime is to get a few pieces of blue litmus paper and place a piece in contact with the moist soil. If the soil is sour it will turn red, and the degree of acidity will be determined by the quickness with which it changes colour and the density of the redness.

Lime also helps to keep off fungoid and insect pests. Clayey soils can stand more frequent and heavier applications of lime than soils of a lighter character, and tends to improve the mechanical condition of such heavy soils. According to their character, soils of the lighter description are dressed with about 2 tons per acre, while cold heavy clays will take as much as 12 tons per acre —such applications being made at intervals of from 5 to 6 years.

It is generally accepted, however, that lighter and more frequent dressings are preferable to heavy dressings at considerable intervals. The best way of applying lime is to make small heaps on the surface at regular intervals and cover these with earth. The moisture in the earth soon causes the lime to slake, and when it reaches the powdery condition it should be spread evenly and harrowed in.

THE MEAT SUPPLY OF COLOMBO.

DEAR SIR,—The meat supply in this flourishing city of ours is just as unsatisfactory as it could possibly be. The fact is that cattle in the East are worked in a fashion that will not be tolerated in a western country, and when their work as beasts of burden is done they are requisitioned to supply the craving of the 'inner man'! Is it not shock

ing that we should have to subsist on the flesh of animals that have been well-nigh flayed alive under the rod of the cart driver, their tails twisted out of joint, their necks galled with many a sore? I should like to see bulls classed under two heads: (1) Draught bulls, (2) Bulls for meat, and the one should not encroach on the functions of the other. It may be said that such a regulation will reduce the meat supply. If so, there should at least be a rule to the effect that the cart bulls must have been out to pasture or stalk-fed for a certain period after giving up the yoke and before coming under the pole-axe. An age limit should also be placed on animals brought to slaughter.

In the meat stalls, beef should be labelled so as to distinguish ox meat from buffalo meat. Further, I would have ox meat classified as 1st, 2nd or 3rd quality beef. All this should be done by the meat inspector or whoever has to supervise the slaughter of cattle and inspect meat stalls. For instance, let the prices be regulated something in this way: Ox meat, 1st 20 cts, 2nd 18 cts, 3rd 15 cents. Buffalo meat, 1st 18 cts, 2nd 15cts, 3rd 12 cts. In this way we shall not be at the mercy of the cook and the meat seller.

The question is, are the proposals I have made practicable? That is a question for the representatives of the people, who have or should have the health and well-being of their constituents at heart, to decide. A conscientious officer can do a great deal even without the aid of the Law and the Municipal prophets. I have heard it said that by the enforcement of stringent measures and close inspection, the medical officer of the town of Matale has materially improved the quality of the beef sold there, and that the people do not object to pay a higher price for good meat, seeing that ½ a lb. supplies as much nutriment as twice that quantity of poorer stuff. Cannot the capital city of the Island emulate the example of the little town of Matale?

Yours truly,

A. C.

[We are doubtful whether the classification of animals as suggested by our correspondent is feasible, but there is something in his suggestion regarding the classification of meat; and of one thing we are convinced, and that is that conscientious inspection of cattle and meat can, to a great extent, remedy the evil complained of.—ED. *A.M.*]

THE JACK (*ARTOCARPUS INTEGRIFOLIA*).

(*Concluded.*)

The jack tree is also useful as a timber tree. The wood is bright yellow when first cut and is hard. It soon turns darker on exposure, however, and when old and polished, compares very favourably with mahogany in durability, beauty of grain, and colour. From India and the South Seas the timber is sent to England, where it is used for cabinet and furniture making, and largely in the manufacture of bush backs. It takes a very high polish, and works up very like satinwood. In India the wood of the roots is used for carving, and small boxes and articles of this wood, after seasoning and being artificially scented (generally by being packed together with sandal wood) are passed off as of this more valuable wood. The principal use of the jack tree in the northern portion of this State would be as fodder, and in this way it would probably prove as valuable as the Algaroba or Mesquit bean tree. The leaves are readily eaten by stock, and it is a tree that will grow in a dry as well as in a hot climate. In some of the dry parts of India it is extensively lopped annually to feed cattle. The fruit also are greedily eaten by all kinds of stock; pigs and calves are very fond of them. The fruit, however, unless allowed to become over ripe and drop, should be split open. As a shade tree in paddocks it is always green and cool.

Like all other artocarpuds, the jack exudes a considerable quantity of viscid milky juice, from which the best bird lime is made in India. This sap is also used, mixed with other material, for caulking small boats and canoes. A yellow or khaki dye is extracted from the wood, bark and roots (and Bernays says, also by boiling the saw dust). As an ornamental tree in the tropical landscape gardening it is in demand, and in farmyards or their vicinity is a grateful as well as handsome shade, and if used for no other purpose adds considerably to the too little used compost manure heap by its shed leaves and fruits.

As a shade for coffee it is popular in some parts, especially steep land, where the soil is a bad retainer of moisture. I have also seen the leaves plaited or pinned together with thorns to make plates for the native's meals of rice, &c. Altogether the tree is thought highly of and considered second only to the bread-fruit in economic value in its native land, where it is one of the few trees left standing and preserved when new scrub land is opened for cultivation.

In India several seeds are often sown together, and the young plants subsequently grafted together into one stem by approach, making a stronger and somewhat quicker growing tree. This is supposed to make the tree come into bearing earlier also, but this is very doubtful. Bernays states that whole fruits are planted for subsequently grafting as above. I have not seen this done, but, if the whole 100 or 200 seeds germinated, the subsequent grafting or inarching must prove a somewhat complicated process. In the same article by Bernays which is about the best I have yet met with on this too little appreciated tree, a method of growing a long stem is described, which I have carried out with some success. By this method of cultivation the seedling jack is made to grow up a hollow bamboo till 2½ to 3 feet high; then the stem which is thin and pliable, is twisted round like a spring or corkscrew—more often in one large circle—on the ground and covered in with earth. This stem grows with the tree, and, if bearing on the stems and branches is discouraged, will often bear on the buried portion of the stem. This procedure is not invariably successful, however. It is an experiment easily made, and the root fruit, if obtained is so vastly superior to others as to be well worth the time and trouble. The first indication of a root fruit is a slight upheaval of

the ground, which subsequently cracks, and before ripening one-half of the fruit becomes visible. The root-fruiting tree is, I think rightly, considered a distinct variety. The seed of true fruit is said to invariably produce true root-bearing stock, which the seed of artificially induced crops will not do, of course. The jack-tree is said not to bear at all if the roots reach permanent water; but this also is not authenticated. It may be propagated by cuttings, but seed is so readily germinated that recourse to the more troublesome method is unnecessary. The seed, however, quickly loses its vitality, especially upon becoming dry, and so this cause failure to germinate them can be often ascribed. For seed, the ripest fruit should be taken. Fruit that has dropped from the tree and squashed gives good seed for immediate planting, but, should seed be required to despatch even on a comparatively short journey, fruit not quite ripe should be chosen. Some say only fruit from the stem should be taken for seed, but I have raised equally good plants and trees from fruit from the branches.

As stated the seeds germinate freely. Frequently on opening the fruit, especially if over ripe, the seed will be found to have already germinated, and to have a root one or two inches long. The spike will be quite small, however, and possibly only just emerging from the germ. But if this root be broken, and it is very brittle, that seed is lost. The seed which is about one inch long and half an inch in diameter will be found within a small cocoon-like bag inside the edible pulp. This peculiar bag is quite loose, and feels not unlike thin wash leather; it should not be removed either when setting for germination or for cooking. Beneath this again is another thin skin, generally red or reddish, and adhering to the seed itself. In roasting or boiling it readily flakes off like the inner skin of a peanut, which it resembls in colour and texture.

It seldom takes long to germinate, generally showing up in a few days. As may be gathered from the foregoing, the root growth is especially rapid and a plant 6 inches above ground will be found to have quite a foot of taproot. When about the size when plants are usually transplanted, it has often too much root to safely allow to its removal without a great deal of trouble. For this reason it is often advisable to set the seeds in the field, or where the tree is intended to be allowed to grow. The seedling is very hardy, but if planted out where most useful—*i.e.*, in the paddock —will require guarding for a year or two until out of reach of stock, for they will promptly eat it down if they can get at it.

The tree requires a soil fairly free from large rocks or bed rocks rather than a lose soil. I have known them thrive among boulders, but die out even at ten years of age when sheet rock was met with 8 feet below the surface. They do not require rich soil nor heavy rainfall. Once established they draw moisture from great depths to the surface, and, while immediately under them the shade may be too dense for grass, pasture luxuriates in their immediate vicinity. For a hardwood tree it is quick growing, attaining a height of 15 to 20 feet in four years, and usually coming into bearing about that time.—*Queensland Agricultural Journal.*

DISEASES INCIDENTAL TO PREGNANCY AND OF PARTURITION IN THE COW.

(*Continued.*)

ABORTION.

Definition—The expulsion of the fœtus and the fœtal membranes before the natural period. Abortion may be considered under two heads, non-contagious and contagious, and I will just consider the sporadic or non-contagious form. The normal period of utero-gestation in the cow is about nine and a half months, some more, some less, and an abortion usually takes place from the third to the seventh or eighth month. After that month it may be termed a premature birth.

Causes.—These are very numerous and they may be divided into internal and external. Of the internal causes the general health of the cow is of the greatest importance, any contagious or febrile disease in the system of the mother is a cause or factor in bringing about abortion, such as tuberculosis, pneumonia, indigestion, gastric tympany, excitement, nervousness, ergotised food, and of course the infecting bacillus.

External Causes.—Cold and wet, changes of temperature, thunder and lightning, frights, narrow doorways, pressure over the uterus, over-exertion, foul smells, icy-cold water, too much food, putrid stagnant water, sewage, frosted turnips, potatoes or roots of any kind, or rotten roots, mouldy bad hay, &c. &c.

I now come to the contagious form of abortion, and in giving the treatment for the sporadic variety I fancy it would be better to consider the treatment of both together, which I intend doing. This is by far the most serious disease of the two under consideration, and it is due to a special bacillus, which I believe was first demonstrated in the year 1895 by Professor Bang, he having made a series of post-mortems of cases, and also made several examinations microscopically of the liquid between the walls of the uterus and the envelopes of the fœtus. In cases that showed premonitory symptoms of abortion he had the cow killed and the experiments carried out as before mentioned, and in every case that he examined this liquid from the womb of the affected cow he could demonstrate the presence of this bacillus in great numbers, and they were unmixed with any other organisms. So, gentlemen, this surely places the theory of contagion beyond doubt. Professor Bang also cultivated this bacillus outside the animal body. He found that it was not easily cultivated by the ordinary methods, but he succeeded in growing it in blood serum rendered solid by the addition of gelatine and agar, and when it was grown in this medium it exhibited quite remarkable characters, absolutely distinguishing it from any other known pathogenic organism. In subsequent cases Professor Bang demonstrated the same bacillus in the discharges from the uterus or vagina of cows that had aborted. So you see, gentlemen, that contagious abortion is really a disease due to a specific organism. Another way in which its contagiousness has been demonstrated is by taking part of the discharge from an abortive cow and putting

it into the genital passages of a pregnant cow, and in nearly every case the cow will abort some time afterward. I also believe that this bacillus is able to multiply outside the animal body, even in soil, dirt, or manure, and this may go a great length to demonstrate the first outbreak in a herd that was previously free from this disease, and it is sometimes very difficult to know where the contagion comes from in the first case in a herd of cows. But in reality it comes from some source, from an apparently healthy, newly bought cow, or from the land they are grazing on having been previously grazed by some infected cow; or from feeding stuff or fodder imported or brought to the byre from an infected place. There is always a cause for everything that happens in this life.

This bacillus is supposed to gain an entrance by the vulva into the womb, or become absorbed through the mucous lining of the vulva into the circulation (because abortion can be produced by injecting the bacillus hypodermically), it then gets into the circulation, locates itself in its *habitat*, so to speak, and sets up the symptoms that we see terminate in the expulsion of the fœtus and membranes prematurely.

Causes.—The primary cause is of course the bacillus. How does it get there? It is sometimes due to an infected bull, during copulation. Sometimes to a newly purchased cow brought from a tainted herd; this will bring it into a byre that was never known to have a previous case, and generally when one cow aborts there are several if not all in the same house. One reason given for this is the contagious nature of the disease, and if a cow retains the after-birth there is always a discharge of infective material, and this soils the tail and thighs, and by means of the tail the infective material is switched about to the other cows in the same house. It may also be disseminated by the discharges into the gutters running past the other cows. By inserting infective material into the genital passages of a healthy pregnant cow, you will generally have abortion in form fifteen to thirty days. As a rule the cow's health is not much affected; it is purely and simply a disease of an infective nature that affects the vagina and womb, fœtus and fœtal membranes of pregnant cows, mares, and ewes.

Prevention and Treatment.—I intend to make this as short as possible. To consider measures of prevention we must think about what will keep stock in health as well as the measures that are necessary to bring an outbreak to a speedy termination. With regard to the former, every person that buys a cow, is exposed to getting his herd infected. When buying a new cow, isolation for a period is a safe plan. On buying a new stud bull isolate for a time, and disinfect penis and genitals for some time before using him for stud purposes. There is a big risk in keeping a bull for the service of outside cows: he should be disinfected and washed after each service.

To bring an outbreak of this disease to a speedy end there are a great many difficulties which present themselves to us. The first is that for weeks, and probably for months, a cow may be affected, and capable of infecting other cows without presenting any symptoms pointing to her dangerous state. It, therefore, often happens that before the existence of the disease in the herd is suspected and realized a lot of the cows have become affected. A cow is infected before she has aborted, but she is more dangerous after and for several weeks, as she then liberates an army of bacilli capable of infecting all the other cows in the herd. When she aborts, it is a good plan to burn the fœtus and membranes; if this can't be done bury them away from access to cows, and disinfect them before burial, and over the grave put some quicklime.

The cow-house will require to be disinfected often and thoroughly, and the cows therein will also require to have the vagina washed out and tail and thighs, udder, and even up the sides, over the back, &c., in fact as far up as the tail reaches, well sponged or brushed with a reliable antiseptic to destroy the bacilli, and the more thoroughly and frequently this is done the better chance of eradicating the disease. There are various agents that may be used for this purpose; some taint the milk and are not practicable. Sulphate of copper is good to use and does not taint the milk—six ounces to one gallon soft water, also sprinkle the floor and gangway with powdered lime; and as a further precaution the outer genitals, root of tail, and in fact the whole tail, it is well to sponge once a day with a solution of Jeyes' carbolic, or hydrarg. perchlor.

℞	Hyd. perchlor.	ʒiiss.
	Acid hydrochlor.	℥iiss.
	Aqua	Cii. 2 gallons.

This solution is dangerous, and any of it that is left should be buried, and it can't be prepared in metallic vessels, for it corrodes them. This disease in its treatment involves a great deal of trouble and labour. When the number of the cows that have aborted is many and there is no chance of isolating them, the best plan is to put the aborted cows at the lower end of the house, so that the urine does not run past the healthy ones; this will reduce the risk of infection. If a cow aborts this year it does not follow that she will abort next year; in fact, experience shows that it is the exception, not the rule.

In regard to the manure, is it not possible that the abortion bacillus will retain its vitality for a length of time in it? I would recommend in this case that the manure be mixed with a sufficiency of lime and left for a good long time before being put on to land that cows will be grazed on afterwards. I must say that wooden cow-houses, when they get rotten, and without paved gutters, the want of cleanliness, houses badly lighted, badly ventilated, badly drained, and in some cases not drained at all, all militate against the V.S. in stamping-out any contagious disease in this country.

INVERSION OF THE UTERUS.

This is a very serious condition in any female animal.

Causes.—Retention of fœtal membranes, irritation of mucous membranes of the organ at the time of parturition, wounds, scraps, hard calving, injuries during calving, over-feeding, tympany, indigestion, icy cold water to drink after calving.

Treatment.—Now when a cow does put out her uterus, the first thing to do is to get to the case as soon as possible after you have been notified about it. Some farmers know to wrap it up in a damp, hot blanket, and send at once for the V.S., and when he arrives the first thing he should do is to remove the cleansing if necessary. Cleanse the organ, dry it with a cloth, and put some antiseptic and soothing dressing upon it, preferably an oily preparation, and return it by gentle manipulation, and put on a truss or West's uterine clamp, not screwed up too tightly to prevent the animal urinating or to hurt the vulva. The cow generally strains a good deal after this. To combat this we give some anodyne mixture, chloral hydrate, chlorodyne; raise the hind quarters with freshly cut sods. There is some danger of metritis, so a little tr. aconite and a mild laxative will prove very beneficial.

RETENTION OF FŒTAL MEMBRANES; SEPTICÆMIA.

This disease is due generally to cow calving before the natural period, or from debility, weakness, want of blood, and mostly happens in hot weather. Dealers' cows that are "faired" and "trained" are very liable to retain the cleansing, and so are very liable to have septic poisoning.

Causes.—The anatomical arrangement of the uterus in the cow, difficult parturition, abortion. Aged cows retain the membranes longer than young ones as a rule. Contraction of the cervix uteri will prevent expulsion of the fœtal membranes. Cows driven long distances to fairs and trained long distances produces fatigue and reduces the general health of the animal.

Symptoms.—Usually part of the membranes protruding, but if not, there is a certain amount of shifting of the feet, uneasiness, urinating and passing faces often; then there is twitching and curling of the tail. One very prominent and reliable symptom is the tail is carried further off from the body than usual, in a kind of an arched manner. If putrefaction has commenced there will be a dirty, sanious, offensive discharge from the vulva, mingled with shreds of putrid membrane. At this stage there is generally constitutional disturbance, the animal is dull, dejected, appetite lost or bad, respirations hurried, temperature elevated, secretions suspended. The complications that follow this state of affairs are generally septicæmia, metritis, metro-peritonitis, vaginitis, leucorrhea, &c.

Treatment.—If the membranes are not expelled in three or four days or less they are better removed, and the uterus irrigated with a solution of ozophene, chinosol, or suitable disinfectant. There are various preparations that can be used for this purpose—carbolic acid, chinosol, ozophene, Jeyes' fluid, pot permanganafe. I find about two irrigations sufficient. If cow strains badly I give anodynes. If in weak health and low of condition, tonic and external antiseptics are indicated. If septicæmia is feared, give plenty external antiseptics, with tonics, stimulants, and good food, easy of digestion and assimilation, and try to keep the animal's strength with milk, eggs, gruel, &c. Sulphites, hyposulphites, sulpho-carbolites, quinine, hydro-naphthol are indicated, and to prevent infection of healthy subjects patients should be isolated, the excreta promptly burned, and covers, &c. used by them disinfected before being used with other cattle.

INVERSION OF THE VAGINA,

Or "showing of the reed," as the farmers call it in this district, is often seen in cattle. The causes are injuries, rupture of the internal bands that hold the organ *in situ*, constipation, protracted parturition, fatigue from long travelling after parturition, abortion, placental retention. Old cows when heavy in calf show it often. Low stand behind, and too much fall for the stand, so that when the cow lies down the whole weight of the calf, stomachs, bowels, &c. are thrown back on the os uteri, and this tends to relax passages and to force out the vagina.

Symptoms.—Generally makes its appearance when the animal is lying, and mostly seen in pregnant cows. The vagina differs in appearance from the uterus, as there are no cotyledons on it, and it is also of less volume with a small round orifice in the centre.

Treatment.—Cleanse and return it after dressing with a little ol. carbolic. This is not a very dangerous affection, although it is sometimes very troublesome. I had a case here a short time ago; this was a prize Kerry cow, and she wore a truss for three months before calving, and she calved here a few weeks ago but did not cleanse; the os contracted very shortly after calving, and I could not remove the cleansing, but I irrigated the uterus with a solution of ozophene 1.30, and she has done well.

LEUCORRHŒA,

Commonly know as "The White," is a chronic discharge from the vagina and womb, of a white flaky colour; sometimes inodorous, at other times of a rusty colour, and muco-purulent, and very offensive.

Causes.—Debility, difficult parturition, uterine excitement, polypus, prolonged irritation of the genital passages, and as a sequelæ to tuberculosis. Sometimes the bull gets balanitis, and gives the cow he serves the disease, and sometimes she aborts.

Symptoms.—Discharge from vulva, which is generally pale, bloodless, and flaccid, in other cases where discharge is flaccid, mucous membrane is rough and reddened and thickened, with stricture of the vagina as an accompaniment; animals so affected are frequently in œstrum, but very uncertain as to breeding, and if they do become pregnant they very often abort. Some constitutional disturbance is usually present, the milk diminished, the appetite very indifferent, and the animal fails in condition.

Treatment.—In the primary stages, cleanliness, frequent injections of tepid water with weak solutions of alum; zinc sulph., pot. permanganate. The administration of a saline laxative, followed by tonics and laxative diet. In secondary or chronic cases, injections of tannic acid, ferri sulph., boric acid, iodoform, or if the discharge is offensive acid carbol. 1·40 or ozo-

phene 1·30 may be used. Internally, mineral tonics, iron or copper, for preference with quinine, with generous laxative nutritious diet, will generally result in a cure.

(To be Concluded.)

HANDBOOK ON SERICULTURE.

Through the courtesy of the Under-Secretary to the Government of Bengal, we have been favoured with a copy of a valuable little work entitled, "Handbook of Sericulture," by N. G. Mukeriji, M.A., M.R.A.C., F.H.A.S. of the Bengal Civil Service, and our contemporary at Cirencester Agricultural College.

In his preface the author expresses the hope that the work will supply the want of a reliable book on Sericulture, and give an impetus to the silk industry in India and the British Colonies. He remarks that the principal drawback to Sericultural enterprise everywhere has been, of late years, the wholesale death of silk worms from certain diseases when they are reared on a considerable scale. The author has been employed by the Government of Bengal for nearly ten years in the investigation of silk-worm epidemics, and embodies in his work the information he has derived from actual experiments, confirmed by actual trials conducted successfully and with pecuniary profit by intelligent cocoon-rearers in most of the silk districts of Bengal.

We learn that a Sericultural School has been established in the Presidency with the object of teaching cocoon-rearers how to avoid silk-worm epidemics, and is doing very good work in diseminating the knowledge that was derived from experiments.

The book is divided into four parts: (1) The mulberry and the mulberry silk-worm. (2) Diseases of silk-worms and of the mulberry plant. (3) The commercial cocoons. (4) Manufacture and commerce.

The following information referring to the various kinds of silk-worms is culled for the benefit of our readers:—

All varieties of silk-worms fall under two heads: (1) Those which make reelable cocoons and (2), Those which make unreelable cocoons, *i.e.*, such cocoons as have to be carded and combed like cotton or wool before thread can be spun out of them. All varieties of domesticated mulberry silk-worms and most varieties of wild silk-worms that are found on the mulberry tree belong to the first of these two classes.

The domesticated mulberry silk-worms are the European (1) Silk-worm or *Bombyx mori*, (2) The Barapalu or B. Textor, (3) The Nistari, Madrasi or Canary silk-worm (*B. craesi*), (4) The Deshi or Chotapalu (*B. Fortunatus*), (5) Chenapalu (*B. Sinensis*).

Besides these there is a variety of silk-worm called *B. arracanensis* reared in Burmah, and another called Barapet reared in Assam. These seem to belong to the *B. Textor* variety, and in the Midnapur there is a variety called Bulu or Blue which makes small greenish white Cocoons. These and the Chotapat of Assam seem to belong to the *B. Sinensis* variety. Among wild mulberry cocoons the Theophilus make good reelable cocoons. The Ocinara, Trilocha, and Rondotia varieties of wild mulberry silk-worms spin very inferior cocoons.

Other silk-worms besides those that feed on the mulberry produce serviceable cocoons. Of these reelable are (1) Bombyx lasiocampaolus, (2) Antheroea Jamamai, (3) A. Pernyi, (4) A. Assama or Muga, (5) A. Roylli, (6) A. Mylitta or Tusser proper. All these cocoons may be classed the generic name of Tusser. Other reelable cocoons have also been discovered, but they are so rarely found that it is impossible an industry.

Cocoons that cannot be reeled are mostly useless. Of this class the Endi or Eri are the best, Attacus Atlas cocoons also fall under this group, and they also are spun by castor-leaf-eating silk-worms. The Atlas cocoons contain oralmost ten times as much silk as the mulberry or Eri cocoons, but the silk is not so soft as the latter. *Atacus Ricini* and its wild form *A. Cynthia* are other unreelable cocoons. The Cricula variety of silk-worms produces a cocoon that is made into thread by certain races in Chota Nagpur. There are hundreds of other varieties of inferior silk-worms of which the produce is not used or is even likely to be used. In France a variety of spiders spins cocoons in pear trees, and the silk from these is woven.

Of all the varieties mentioned above the European mulberry cocoons are the best.

A few years ago a good deal was heard about Lasiocampa Otus found in Dalmatia, but the cocoons have not been found to be a superior commercial article.

English cocoons were nearly all originally derived from China. At present the best cocoons are fouud in Italy and France.

The Paipitsan cocoon, the best of the Chinese, is the origin of the white Shanghai of Italy which is recognised as the best of all cocoons. In France a class of cocoons called moricauds (negroes) is spun by a hardy black worm. There are numerous other superior French and Italian cocoons. At Smyrna a Mr. Griffiths has by scientific selection established a superior class spun by very hardy black and zebra caterpillars.

We must here conclude our notice of this very useful work, the text of which is illustrated by pictures and diagrams, and take the opportunity of thanking the author for the valuable information he has placed at our disposal.

GENERAL ITEMS.

The earth-nut or pea-nut (*Arachis hypogæa*) has come to be considered one of the best foods for poultry, whether laying hens or growing chickens, excelling maize, wheat or oats. Unlike the first two it does not over-fatten, and keeps the birds in good health. They are thrown with tops and all, and keeps hens busy all day.

To harden tender shoulders and backs of animals, daily washing of the parts with an infusion of wattle or other tanning bark is recommended as a cheap and efficient treatment.

The famous "Latakia" Tobacco, known as "Abou-Riha," is so named from the district of Lattakia, in Syria, where the variety is principally grown. The chief peculiarity in its cultivation is that the plants, which are very closely planted, are hardly watered at all, and in the process of curing the leaves are made to absorb the fumes of the resinous and scented wood called "Elozr."

Among the reports of the Agricultural Department of Queensland we read in that the Manager, State Nursery, Kumerunga, under the head of Bananas:—"Very little has been done beyond preserving the better varieties of these. A number have been distributed to applicants, and a small collection was despatched to Ceylon." These latter, consisting of varieties, were received for the Colombo Stock Garden, where they are doing well.

The following recommendations given in the *Queensland Agricultural Journal* for getting rid of the black ants, indicates how great a pest it is:—(1) Sprinkle shelves &c. with oil of penny-royal. (2) Wash with Carbolic soap. (3) Dissolve a piece of Ammonia, the size of a hen's egg, in a quart of water, and brush the shelves with it. (4) Pour gasoline into their nests (if outside) and set fire to it. (5) Lay carpet rug strings soaked in corrosive sublimate in their path. (6) Make the following mixture: White lime (slaked) 6 quarts, kerosine oil ½ pint, turpentine 1 wine glass, soft soap 5 lbs., cowdung 3 quarts, water 16 quarts. This latter is for washing fruit trees. The preparation of these remedies is troublesome enough, but after all we are told that none of them are permanent and will require repeating often!

The following recipe from the same paper is for making a cheap cooling paint for iron roofing:—Take unslaked lime and slake it with sufficient water to cover it. Stir into it old brine from a salt beef cask or other source, sufficient to give the lime the consistency of oil paint. Strain before using and apply with an ordinary limewash brush. [How would this do for the dreadful Calicut tile in warm weather?—ED. *A. M.*]